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NATURE, PHILOSOPHY, and ART IN FRIENDSHIP.

An E S S A Y.

In FOUR PARTS.

I. Demonstrating the Necessity and Practicability of Building all Manner of Houses proof against Fire and Vermin; together with several curious and useful Observations on the Statutes relating to Builders, and Remarks on some capital Buildings lately erected in Westminster.

II. An entire new Plan of constructing Chimnies, so as

the Smoke cannot reverberate.

III. Plain Methods pointed out, by which Smoaky Chimnies may be effectually cured.

IV. Certain and easy Directions to all Mechanics in Wood, how to finish Household Furniture, and the Wainscotting of Rooms, so as no Vermin can exist therein; and also how to cleanse those already infected.

R With DRAWINGS and REFERENCES.

To which is added,

SIX LETTERS ON INTERESTING SUBJECTS.

The SECOND EDITION.

With an APPENDIX,

Giving a particular ACCOUNT of the late INVENTION for preventing FIRE by IRON-PLATES, which the PARLIAMENT granted a PREMIUM for last SESSIONS.

By W. CAUTY, CABINET-MAKER.

L O N D O N,

Printed for W. NICOLL, in St. Paul's Church-yard;
and I. TAYLOR, in Holbourn, near Chancery-lane.

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DEDICATION,

Addressed to the PUBLIC by the
AUTHOR.

THE essays in this little work come like a drop'd founding into the world, begging your kind protection; and the Author humbly hopes, if there be found in them any essential merit, they may prosper better in your hands, than many ushered into life with pomp and magnificence, under the patronage of the great and opulent.

It may be said with truth, that his designs are well intended; and he frankly owns, the hopes of promoting

moting his real business, a generous ambition to be of some service to the Public, and the approbation the MSS. met with from several friends of unquestionable merit, particularly the late most excellent and ingenious Lord EG-MONT, were the principal causes of his venturing on the public theatre. Add to these motives, several of his letters on various and interesting subjects, which have appeared in the public papers, under the signature of *W. Benevolus*, which were well received, encouraged him at last to venture the essays in question to the public's censure or approbation; being fully convinced that their voice on all subjects of this nature is the most essential proof of their

value

DEDICATION. v

value or demerit. Whatever that may be, I shall acquiesce with the greatest complacency imaginable, and am the Public's

Most devoted and

Most obedient Servant,

W^M. CAUTY,

Cabinet-maker and Arch^t.
King's-street, St. James's.

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T H E
P R E F A C E.

TH E happiness of mankind has ever engrossed the attention of the benevolent and well-disposed, and the most successful therein have been generally requited with the grateful acknowledgments, not only of their own, but of after-times.

It is true many have shewn ingenuity without success; however their disappointments were still alleviated by the consciousness of a good intention, which the generous and disinterested are ready to acknowledge upon every occasion.

It is universally allowed that every person's happiness consists in the goodness of
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his disposition, and the actions resulting therefrom; and this happiness must flow no less from a present enjoyment than from a prospect of what is to come: the most rational entertainment therefore to a good man, is to do what may be beneficial to society.

How have the Alexanders, the Conquerors, or rather destroyers of mankind, been deified by the unthinking multitude; what castles and fortresses have been erected, under the specious pretext of preserving the lives of mankind? while tyranny and oppression were really the principal motives. And it is observable, that of 200 battles that have been fought in Europe during the last and present century, three-fourths have been occasioned from a contention about fortified towns.

Had the conquerors of nations, either

antient or modern, built their cities, or persons of property among ourselves, reared there palaces in the manner here recommended, many of these had been still standing, and multitudes of people had been preserved from sudden and unexpected deaths.

It is never too late to amend, said a good-natured antient, nor yet to improve upon a subject; and this before us is of the most serious kind. It would be endless to enumerate the sad catastrophes that have happened through the kingdom in general, and particularly in this great metropolis, since the fire of London 1666, all owing to a want of attention in the construction of the different edifices. That terrible conflagration was occasioned by an useless multiplicity of timber almost in every house, joined with the narrowness of the streets: and though this dreadful burning gave rise to
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the first act of parliament made in the 19th year of Charles II. directing all builders, under pains and severe penalties, not to erect any wooden walls, or walls covered with plaister, either in fronts, sides, or rears of their houses, on any pretext whatsoever, higher than the bracemores; and these bracemores are ordered and fixed by the above act, to be only ten feet high from the shop floor; yet this act is evaded every day in London, by bow-windows, innumerable or illegal projecting wooden plaistered walls, carried up as high as the roofs of the houses to which they are fixed.

For the good of all, especially gentlemen of fortune and builders, for whom this treatise is principally intended, I heartily recommend to them that they would purchase all the acts relative to building, and study their true spirit and meaning, and practice

practice accordingly : then, and not before, their works will bear the least scrutiny or examination. Besides the act of Charles II. already mentioned, I recommend the acts of the 3d and 6th of Queen Anne, and that of Geo. I. and Geo. II. but more particularly the two last acts of our present sovereign Geo. III. Ann. 4th and 6th. By perusing them properly, and with due attention, they may turn out to be of great advantage, and prevent law-suits and other litigations : but if the builders of these bawbles will neither hear nor forbear, but go on in such illegal works, and advise both gentlemen and substantial tradesmen to those things, the pains and penalties will fall upon the principal builders and proprietors. All these acts may be had at the King's Printing-Office, in West-Harding-Street, Shoe-Lane, for 6d each, except that of Charles II. which is half a crown.

Upon a serious review of what is already observed, we hope the axiom of every man's right to judge for himself, will appear to be weak and ill founded : for sure every intelligent and impartial person must applaud a scheme which tends to promote the public good, since the interest of particulars is never to be put in the balance with that of millions ! Had the plan here proposed been put in execution sixty or seventy years ago, it would have saved millions of money, and what is more, would have preserved a number of valuable lives.

How many stately edifices, churches, palaces, cities, libraries of infinite value, kings and merchants store-houses, arsenals at home and abroad, have been destroyed by fire ? the catalogue of which would almost form a volume of itself : the fact is notorious : the thinking and intelligent will see the force of the reasoning in all its extent.

The ancients built their magnificent edifices and temples with very small quantities of timber in them; witness Westminster-abbey, and the famous cathedral at York, &c.

The moderns seem almost to have forgot to copy after them; and I will be bold to say, that if that incomparable extra dome of St. Paul's Cathedral, London, had been constructed without timber at all, but of best bricks and tarras, as the conic circle upon which the lanthorn rests, it had been a finer piece, and done more honour not only to the memory of the great architect, but to the nation in general, and covered with copper-plates instead of lead, the latter having been melted in very hot weather.

It is highly probable that the first inhabitants of our globe lived in caves and holes;
and

and that architecture, like other sciences, had its infancy and progress; but, like all other ingenious arts, will ever be wanting improvements; and may never possibly arrive to that summit of perfection that could be wished for.

No doubt several carpenters will treat the method of building arsenals, and even warehouses, with small quantities of timber, as romantic and preposterous. However, we do not appeal to the interested, but to the impartial, begging they would consider the noblest structures reared by the antients; some of which have already existed above a thousand years, and probably will till the end of time, as not being capable of being devoured by fire, which often reduces to ashes in a few hours, the works of the moderns, which cost millions of money, besides many years labour and incredible pains.

Neither do I claim any great merit by this plan, except that of having endeavoured to improve in the art of building; and having met with some ingenious accounts of houses built in France, years ago, which have answered the proprietor's expectations, I was encouraged to offer my endeavours to shew, that but small quantities of timber ought or may be used, either in roofs, ciellings, floors, or stairs, in comparison of what is commonly buried there.

It is a shocking contemplation, that we are only to live and then to die, without attempting some real good to society, or a desire of real happiness: this would be to level us with the brutes that perish; whereas the very make and form of our bodies, and much more the faculties of our minds, shew that we were made for an hereafter: for man's countenance was turned by his Maker toward the stars. As

As the additional essays were well received by the public on their first appearance, we hope they will not now be disagreeable, though somewhat foreign to the preceding part of the work.

*'Tis great delight to smile at some men's ways,
But higher still, to give just merit praise.*



Natura, Philosophia, & Ars

IN CONCORDIA.

NATURE, PHILOSOPHY, and ART

IN FRIENDSHIP.

An ESSAY.

S in nature there are but two
A principles, matter and motion;
and this matter is either fluid,
as air, fire, water, mercury, and
oil; or fixed, as earth, metal, minerals,
stones, and diamonds; there are no sen-
sible qualities resulting from any of these,
but what arise from their modifications,
B the

the cause of which is owing to the figure, size, magnitude, and position of their constituent particles; the right consideration of which is the immediate object of an impartial enquirer, who has no other object but that of preserving the lives of his fellow-creatures, and being useful to society.

The first thing to be enquired into by a builder, is the situation and extent of the spot upon which the structure is to be reared.

The former belongs to the proprietor, but both to the principal surveyor. If in the foundation there be found any loose or marshy ground, let that be well piled and planked, or arches thrown over it, as was practised in the foundation of St. Paul's, London, by my late worthy friend Mr. *James Gibbs*, surveyor under the great architect Sir *Christopher Wren*.

Great precaution ought to be taken in not digging too low, or removing a firm stratum of gravel, and building on the next lower one, which is commonly loose and soft. This

This error was notoriously practised in the foundation of the piers of Westminster-bridge : Strange, indeed, to dig entirely away an excellent stratum of gravel near five foot thick, and then sink their great caisson on the sand, without a single pile to support it !

It was no wonder that one of the piers sunk five feet, so soon as it received the weight of the two adjoining arches : it is surprizing the others did not go the same way.

Their only proper method was to clear the bed of the river, then pile with judgment in proportion to the strength of the ground, which is only found by boring, and with the horizontal saw cut the piles off level with the bed of the river ; afterwards let down their great caisson well directed, and 'tis hardly probable any misfortune would have happened. In which event two years labour had been prevented, and twenty-four thousand pounds of the public money had been saved.

This famous bridge was begun in 1738, and in ten years the arches, *viz.* 15, with the ballustrades were finished, when the pier already mentioned sunk five feet, for I measured it before it was taken down or observed by any other, and then it had preponderated four feet four inches: the two adjoining arches were entirely taken away, and the sunk pier taken down to low water mark; but before they took down the two arches, the strongest centers were placed under each, and then an immense quantity of old cannon, &c. laid on the sunk pier, in order to depress it still the more.

Two years were fully elapsed before the arches and ballustrades were put in *statu quo*, and £.12,000 were granted by parliament each of the two last years for finishing the whole; the total expence of the fabric amounted to £.3,12,000, a well laid-out sum indeed, since the bridge is now one of the finest and most useful in the world, and every way convenient both for the town and the country.

[The north end of it lies within 800 feet of Westminster-hall, a structure that raises the admiration of all. It was built by *William Rufus*, son and successor to *William the Conqueror*, about the year 1095, and now is the seat of justice, the different courts being held there.

Adjoining to this stupendous hall, are both houses of parliament; and hard by stands that ancient and wonderful structure, Westminster-abbey.]

This celebrated bridge across one of the most famous rivers in Europe, contains fifteen semi-circular arches, and occupies the space of 1500 feet from shore to shore; the centre arch is 76 feet, the other arches decline four feet each, so that the second and fourteenth are 48 feet each, and the first and fifteenth are only 30.

The ballustrade is strong, well designed and nobly executed, seven feet high, consists of a stone pedestal three feet high; the banisters three feet high and twelve inches square, and the cornice one foot

[6]
thick; no moulding but an hollow to throw off the drip. On the centre of this ballustrade is a large pedestal, designed for an hieroglyphical figure, shewing the great utility of the river as to commerce, and the conveniency of passengers.

We shall only add, that our criticisms and observations are well intended, and that the excellence of the whole is so truly great, that

Such as paint it truest, praise it most.

As we have touched a little upon Westminster-bridge, it will not be impertinent to make a few remarks upon the bridge at Black-fryars, and which are submitted to the judgment of the learned.

The city committee directed to conduct the operations of Black-fryars stone bridge, published advertisements in September and October, 1759, inviting the ingenious to give in plans, elevations, and estimates, concerning the building of this structure. In consequence of this, twenty different plans were given in, and the au-

thor of this treatise, from the circumstance of his firname beginning with a C, was the second to be called in, on the first day of November that year at Guildhall; he produced his plan before the Lord Mayor, who was then in the chair, and the Court of Aldermen; it consisted of eleven semi-circular arches, the middle one an hundred and ten feet in diameter, the other four on either side diminishing ten feet each toward the shores, while the first and eleventh that joined the land were but thirty-four feet each span, containing in all from shore to shore, including the piers, eleven hundred feet.

In this plan I also designed and explained the necessity of a high-sided caisson of 28 feet, by which the workmen might be protected from every obstruction, even that of the tides themselves. This they observed exactly in theirs, and adopted the method laid down by C. in all its particulars, respecting their caissons and foundations: a method that greatly forwarded the work, and bought by experience, as

the caissons in which Westminster piers were built were but ten feet high, and in every high tide the workmen were obliged to give over until the piers were above high water mark.

I borrowed the stairs, ballustrade and pedestal, from Westminster, and wish these had been adopted in the Black-fryars structure, which indeed are pretty little things, and well set, (I mean the ballustrade and pedestal) but too low by two feet, as they are troublesome to people of an ordinary size, and neither safe nor agreeable to children: besides, strength and grandeur, those essentials of every public work, are here sacrificed.

As to their stairs, they are noble, strong, and grand; but we cannot help observing, that ease and safety here give place to beauty and novelty: if any person, either sober or intoxicated, makes a false step, he is in great danger of breaking his bones, or falling into the water: of this there was an instance about two years ago; a person stumbled upon the steps, and had

it not been for a wooden partition that had been placed for preventing people's going down to the water, he had rolled to the bottom of all the sixty steps, and perhaps had been drowned; however, he was greatly affrighted and bruised, and when got to the top of the stairs, owned the truth of this observation, which two gentlemen had made to him but a few minutes before.

'Tis submitted to the impartial, whether *C*'s plan, so like that of Westminster, did not deserve the preference: it consisted of twice twenty steps only, with a flat in the middle going, of 20 feet square; and if the centre of this bridge under consideration had been of the same elevation as it is now, and had declined toward the land ten feet more than it does, twenty steps would have been saved on all sides, the rain had run off better, and the safety of the people had been more certain: a consideration, we hope, that may merit the future attention of the public.

C. also

C. also demonstrated the necessity of piling each foundation below the piers, but in no case to remove the stratum of gravel that nature had provided; an error which the Westminster surveyor had unfortunately fallen into, contrary to all the reason in the world, and the nature of things.

After the committee had asked C. the proper questions, they closed the examination with this: "What money do you think sufficient to defray the charges of building the bridge? and in what time may it be finished?" "The charges," I answered, "will amount to one hundred thousand pounds sterling, and the time to finish it will be ten years."

Having retired with my drawings, I was but just got thro' the anti-chamber, when I was recalled. The then Lord Mayor very politely said, "Will you be pleased to leave your drawing with the committee:" to which I answered, "With all my heart, you do me honour;" so left it,

it, and in a few days it was sent back with thanks and politeness.

Besides, C. never imagining the matter had been predetermined, executed another design, of nine segments of arches; the middle 120 feet diameter, the four on either side diminishing ten feet each.

But the principal idea in this drawing consisted in a clear demonstration, that the whole ballustrade and foot path was to be a segment of one flat circle from shore to shore; a thing not to be found in any author; not like the foot-walk of Westminster-bridge, which seems to rise and fall on every pier; and even that, though owing to the nature of the plan, might have been a little remedied if foreseen in proper time.

The illustration of this flat arch-walk and ballustrade will appear more clear, if we consider the breadth of the river at Black-fryars to be 1100 feet, allowing this to be the base line, the extreme parts of which to terminate our flat arches, giving fourteen feet for the depth of
water,

water, twenty feet for the vacuum of the great arch for the craft to pass at high water, six feet for the thickness of the arch at centre, and seven feet for the ballustrade and pedestal; the whole making 47 feet: the extremity being given, the flat circle on a large plain is easily described, whence the moulds to work by may be formed.

To carry this idea a little further, for speculation only: Supposing the materials very good, and connected together as one solid body, and also allowing the abutments on the land not to give way in the least, and the intermediate piers to have been either all struck or removed, would that great flat arch give way? It certainly would: though good materials skilfully compacted will sustain any weight that is adequate*.

We cannot quit this elegant structure without observing, that the foundations are judiciously laid on piles well

* 'Tis from the infinite number of parts, of which our arch is composed, that this imperfection arises.

drove in, and excellently disposed ; their horizontal tops are levelled to the clear bed of the river, on which the bottom of the great caisson rests ; and though the piers do not consist all of solid stone like that of Westminster, yet, if I mistake not, the four or six first courses are all solid throughout, and all clamped and united with iron every way necessary ; and where the whole is not of solid stone, yet they are so ingeniously united by courses of Portland at proper distances, and these bound and secured every way with iron, and large dove-tails of English oak, and the interstices filled up with the best lime and stone, that nothing but time can destroy them.

The arches are only nine in number, the finest and most beautiful perhaps in the world ; their form is elliptical, which renders them more convenient for navigation than if any other shape ; the centre arch is 100 feet diameter, and about 24 feet higher than the surface, even when the tide is at the full ; the other arches diminish

diminish about five feet each toward the shores, but some of them are six inches smaller, if the copper plate be just.

The two Ionian columns, with their pilasters and projecting cornices placed on the cut waters of each pier, are of exquisite beauty and magnificence, taking from the structure that heaviness with which too much plainness and rusticity are attended; for, besides the novelty of the idea, such erections, so excellently well accomplished, give a sensible pleasure to every gentleman of taste and genius.

Whoever projects for the benefit of the public, ought to be highly esteemed: the tribute of applause paid to Sir *Christopher Wren*, *Inigo Jones*, and *James Gibbs*, in the former century; to Mr. *Adams* and Mr. *Miln* in our own; bear testimony of this no less than the particular respect in which *Paladio*, *Vitruvius*, and *Scamoti* among the antients, not to mention the wisest of kings, have shone for ages, and been decked with civic crowns of applause;

plause; their plans have diffused a general joy both to the rich and to the poor.

Besides the reputation and eclat conveyed to a country from stately erections, very great profit is also derived, since multitudes come from every quarter to view what is striking and majestic; and nothing is more certain, than that travellers who came from all places to view the magnificent and costly buildings erected by *Louis XIV.* have spent ten times more money than what all of them put together might be worth.

'Tis true, that tho' on the 9th of June, 1769, the hulk of a French privateer, coming up to be dissected at Willifs-wharf, joining the east corner of Westminster-bridge, struck against one of these pillars with her prow, and fractured it about 8 or 9 feet above the base; yet it was restored so effectually in a few days, that now there is not the least vestige of a blow. Plain truths are sometimes disagreeable, but such as may contribute to public

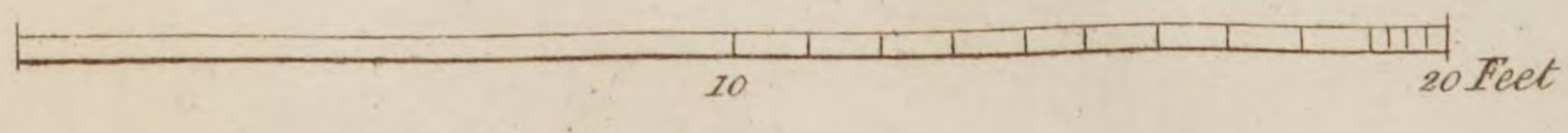
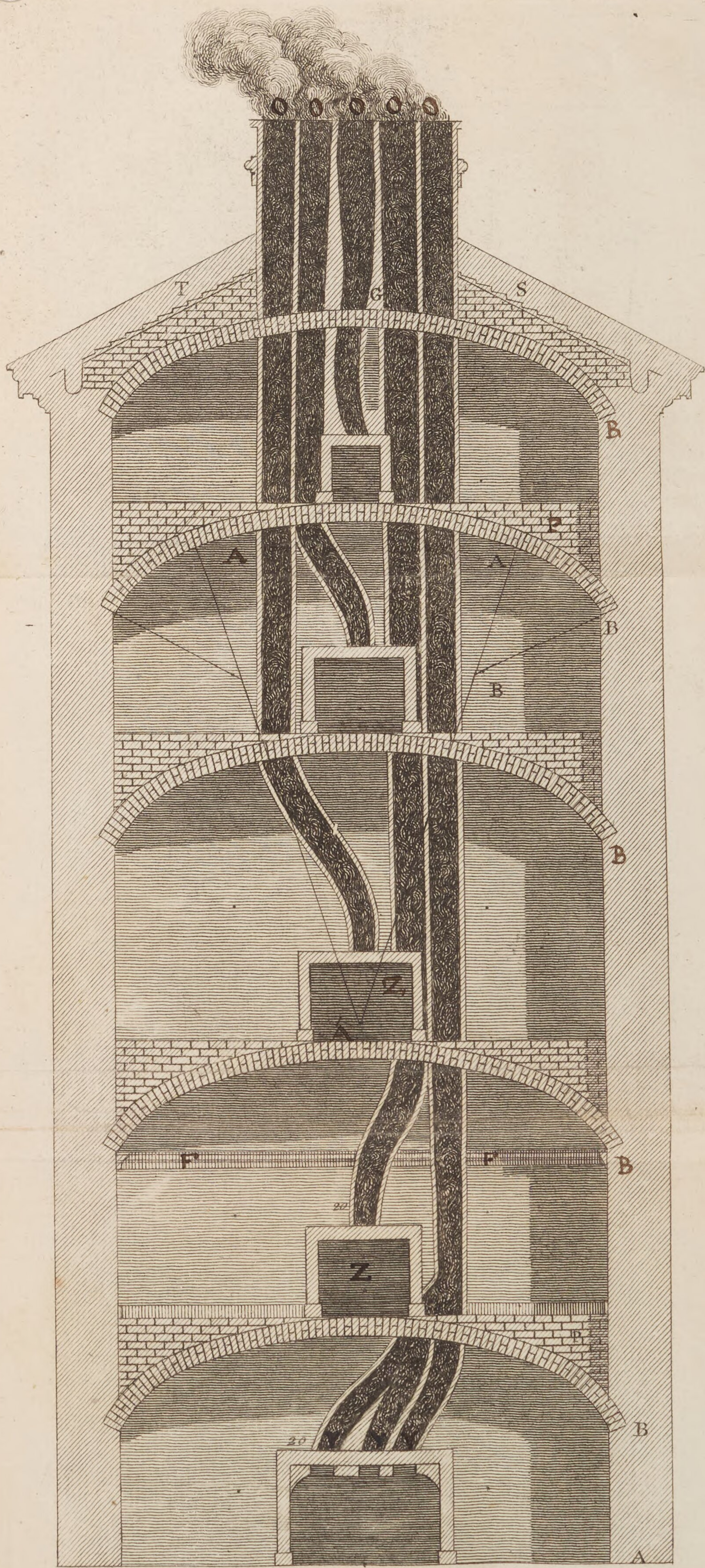
public

public utility, ought to be fairly considered, and gratefully received.

If the hypothesis be granted, as to the building of flat brick and terrass arches; the following plan, 'tis hoped, will meet with no insurmountable objections, as it regards principal houses, arsenals and merchants warehouses, &c. &c. not only in Great Britain and Ireland, but through the whole extent of the British empire; and lays down a method for rendering them proof against fire, and where neither rats nor mice will find shelter.

To effect this, timber must be excluded from all roofs, floors, and staircases; and, if the proprietor pleases, iron doors and windows may be made with every ornament wherewith they are executed in wood; the richest decorations may be introduced in the cielings of the rooms of the principal apartments.

In the annexed drawing is the sketch of a small house, consisting of a kitchen,
parlour,



parlour, first floor, second floor, and a garret : B, B, B, B, B. If this small structure can be executed with propriety, as several have been done in France, of a larger extent ; no doubt any fabric, or range of buildings, of just dimensions, may be effected with the same ease, provided there be money, good materials, and able workmen.

First then, the ground being laid out to the satisfaction of the proprietor, let the foundation be properly dug and secured, by piling, planking, or arching, according to the nature of the ground, and as the necessity of the building may require ; since 'tis evident, that if the foundation be weak, the structure must fall.

All vaults and cellars below ground must be composed of good bricks, and the best quick lime, because of the damps ; and not of old stale rubbish, commonly used in the lower apartments.

N. B. All the principal exterior and interior walls of every building of con-

sequence, must stand with their niches some months before you begin to set your flat arches, or floors; the goodness of the season, and judgment of the surveyor, &c. will best determine this essential point. *

To describe the principal flat arches of our cielings, let fall a perpendicular from the centre of the wideness of your room, which in this plan is 20 feet, and from that perpendicular point A, describe your great flat circle, as A A; then take the height of the rising of your arch, which is one fifth of the wideness of your room; being four feet, describe an equilateral triangle, whose sides are the same with the rise; the lower points of this angle will describe the flanks of your ellipsis, and form an agreeable cieling, at the intersection of the points A A; the small

* *Ex. grat.* A great part of the inside of the Duke of Grafton's new house on Hay-hill, London, fell; being built in a very rainy season, and with too much precipitation, August and September, 1769. The damage would not been much minded, but several poor men lost their lives.

rise that naturally falls out there, through the hollowness of the elliptical flank, will be entirely obliterated by the moulding that goes round the room ; and, whether it had any cornice or not, will look infinitely better than when the curvature is carried on with a regular sweep, as appears in the section of A A, F F. By keeping to the same centre, the points of the triangle A, B, and C, form the thickness of your flat arch, or floor ; which may be of 3, 4, 5, or 6 inches, as the nature of the apartments may require ; all composed of the best bricks, one inch thick, and no more ; one but half the length of the other, ten inches long by five, well and judiciously set with best tarras, or mortar ; all flat, and first dipped in water, for the sake of unity. But more of this hereafter.

The space between the principal wall and the back of the principal arches at bottom must be filled up with dry rubble and tarras, to the height of 12 inches, or more ; which will unite the arch and

wall together in such a manner as effectually to prevent any lateral pressure from affecting either, as described at each flank, B B. Upon this flank, and the back of the arch, as at P P, you are to set long thick bricks, back to back, 15 inches long, 10 inches broad, and 2 inches thick, united together with the best tarras; they must slope and dwindle away within two or three inches of your centre, or level of the floors; and for the thickness of the floors themselves, those ribs or partitions must be about three or four feet distant from each other, and the spaces between them filled up with very dry earth, that the crust of the arch may not be hurt by damps, but kept dry, and consequently strong and firm to carry any load that may be laid upon it; the dryer it is kept the better.

When these buttresses and flanks of our arches are well consolidated, and dry, you may level your floors in the ruff, but that part of the work must be the last, either with bricks or good mortar.

What

What is observed on this flat arch of the parlour floor is sufficient, and demonstrates the rules of all the others, though the curvatures of the parlour cieling are the same with the first floor, second, and third; and ten inches flatter than the kitchen, and uppermost arch or cieling, which bears the roof the same as the kitchen; the reasons are plain and obvious, for strength and utility; and when the materials are good, the taste must determine the shape it is to be of.

'Tis observable, that in all uncommon buildings it is not possible to go on with them in the common way; the necessity of keeping them free from damp and rains must oblige us to carry up our principal extra and infra walls, with their niches, &c. as marked through all the stories, as at B, B, B, B, B; the niches on which all the arches take their rise, the first brick set nearly upright, or almost perpendicular with your wall; all the rest, throughout your whole arch,

C 3

flat;

flat ; and well cemented with best tarras, with the fire or spirits in it.

In carrying up the principal extra walls, the centers which give shape to the cielings may be thrown over as you ascend in the buildings, and will be of use and excellent purpose for both ends ; but if our building is designed to be more than three stories, outside shores will be found most reasonable and safe, not only for erecting scaffolds, but for resisting all lateral pressures whatsoever, especially when 'tis settled, that our uppermost arch, on which our roof rests, must be finished first, and our extra and infra walls have stood some months, all well covered in, if needful, and the season required it.

When the principal outside walls have stood some months without any flaw, as also the inferior walls, and that the centres of the flat arches for the floors are all carried over, you must throw over your uppermost story, the arch on which your roof principally depends ; which, when

when done, will keep all the wooden centres of the lower ones dry through the season, if it cannot be other ways avoided.

To do this, you must nearly follow the direction for cieling the kitchen; the brick buttresses of which run parallel with the floor, but in this they must slant with the slope of the roof.

The bricks that compose these buttresses should be 15 inches long, 10 inches broad, an inch and a half thick, clapped back to back, with the best tarras, and first dipt in water, which expels the air, and by filling up the pores of the bricks with the tarras, renders the union inseparable: these buttresses are set upon the flat arch all over the roof, about 12 inches distant from each other, and vacuums between each, so that windows may be pierced through the roof, wherever it is found necessary; the brick slates that cover the roof must be 20 inches long, 15 inches broad, and 3 quarters thick, so laid, that none of the joints may intersect each other; and that if any

of them were broken or cracked, the rain might not fall on the uppermost, nor penetrate through, but be prevented from descending to the lower arches: the summit of the roof must be covered with tiles, answering the angle, and the joints so placed as not to intersect those of the others.

The roof, as you see in the section, rises 8 feet 6 inches, which is little more than one third of the extent of the building, from one end to the other in breadth. A gallery in the middle, as at G, four feet broad, and five feet six inches high, formed in a Gothic arch, will be of singular use to enlighten the whole, and to walk under the roof; it will also be a support to it, and will ease the centre of the flat arch, to which all bodies must gravitate until they are perfectly consolidated; however, this can never be executed, if there be any chimney in the upper story.

Our roof being covered in the proper season, and it must, if possible, before
 7 the

the frost sets in, since cold rends plaister, and is apt to destroy or chill every cement. If the Spring be gentle, let your centers be all finished, and well turned, since these give the true shape to our arches: let the niches be perfectly cleared of every particle of dirt, or rubbish; you may begin to set the flanks of your arches upon the niches, your line being stretched exactly to the breadth of your bricks; you must carry on one course of bricks at a time all round the room; but one good workman may follow another, and so on till you rise gradually, and close the triple rows with one in the centre of your arch; in the finishing all, being well set in their uniting parts, with your tarras slack'd on the spot: you use it with the spirits and fire in it. This roof or cieling, so constructed, will, with the three, or at least four thickneses of one inch thick brick, made in the whole only, if three bricks five inches and an half, *viz.* one inch and a half for the floor, three inches for the three bricks, and one inch for the

the

the tarras between the bricks, and the fine coat that finishes the cieling.

Many examples might be given of the strength of these flat arches, when done by able workmen, and such good materials as here recommended ; nay, it is plain, the lateral pressure must be entirely removed by the strength and unity of the arches themselves, nearly as much as if they were cast off in brass, or iron : if indeed they were subject to bending, or giving way, as joists of houses do, in that light, the lateral pressure might prevail through the whole, and sensibly affect the buttresses, and somewhat the principal walls themselves.

It cannot be denied but both flat and acute arches have fallen ; but the first never by pushing out its flanks or pillars, but fall in a perpendicular direction, owing to the badness of the materials, the season, or unskilfulness of the workmen ; the latter has often fallen by the weakness of the abutments, and the badness of the foundation, to which all bodies naturally press,

press, in proportion to the acuteness of the angle of direction, like water which runs or stands on any surface, in proportion to the level or declivity of the plain on which it is thrown.

Though the antients formed all their roofs and arches in acute angles, even to 70 or 80 degrees, and not satisfied with that, erected abutments and buttresses behind each pier, to remain there as principals of their buildings, and to prevent any lateral pressure; yet surely those apprehensions took their origin from the vast quantity of matter, or the thickness of the arches, with which they loaded all their piers.

What has been observed before in the construction of good houses for habitations, both of rich and poor, and the safety of their lives and properties, will, we hope, leave no manner of objection against the king's and merchants ware-houses, rope-houses and arsenals, which neither red-hot balls, nor cold, nor fire, either accidental or designed, can affect or ruin, but the goods in one single apartment only.

But

But it perhaps may be said, that great warehouses and arsenals are too wide for flat arched roofs and floors. This can be no material objection, since the principal walls must be proportionably thick to the width; if our houses be forty feet wide within the walls, then one-eighth of that being five feet, is sufficient for the rise of your ciellings, from the nich in the principal wall: which walls must be proportioned to the width likewise, viz. three quarters of an inch to each twelve inches of the within extent, will give the principal walls thirty inches for their thickness.

Doors of iron made in a light and proper manner, and pillars of the same, where truly necessary, and where partitions are not, or perhaps may not be convenient for room, will be of excellent use; and those pillars ranging throughout all the new houses at proper distances, and perpendicularly to one another. Stairs may be cut through our arches wherever most convenient, with the greatest safety; but when they interfere with the apartments, their
planes

planes may, and ought to be, extra of the planes of the principal house within, and illuminated from the sky ; as they are in almost all the principal houses both in town and country.

As the goodness of materials is a most essential consideration in all good superstructures intended for duration, and absolutely necessary in the construction of all flat arches for roofs, floors, or cielings ; the best tarras, if not found in England, must be had, if from France.

What a surprising phænomenon would it be, if our coasts opposite to those of France (which produce infinite quantities of the best tarras, viz. Picardy, Normandy, Bretagne, and the famous Lahagne Bar, which is opposite to Chichester in England ; also Bourdeaux, Bayonne, and Roufillon, all principal places for the finest tarras) did not, if skilfully managed, produce as good tarras as any they have, and reason and nature seem to coincide with our opinion : that little narrow branch of the great ocean which divides the two kingdoms, seems
only

only to have happened by a shock of an earthquake, or perhaps by the great flood in Noah's days. The earth then and since has, in her outward form and figure, in many countries, changed her countenance so much, that the most intelligent geographers are left greatly in the dark. But as to the essential stamina, or principal matter, of which our earth was first composed (by the Almighty fiat) we cannot admit a doubt of its being the same as in the beginning, without admitting the greatest contradiction to all the reason and philosophy in the world.

And indeed we cannot help thinking, that if a plan was properly drawn for improving some of our English rock into tarras, and laid before his Majesty—we have the best reason to believe it would meet with proper encouragement; especially when it is duly considered how many storehouses and noblemen and gentlemen's fine palaces have been destroyed within our memories; and within these few years, by fatal fires both at home and abroad; which, had they been erected

according to the plans we have so strenuously recommended, had saved many lives and millions of money.

As it is an undoubted truth, that the best scheme which ever was formed, never took but by very slow degrees, it is a question if the scheme we have recommended ever does, in this or the succeeding age. Such numerous and invincible arguments are against it—Carpenters must turn masons and bricklayers, or starve; but the time our houses would last, must starve the carpenters quite. But notwithstanding all that can be said against the scheme, reason and the safety of mankind will still have force enough to justify our pains, especially in recommending the immediate practice of it, in all public and great warehouses and arsenals: such can meet with no opposition either in theory or practice, but want only fit opportunities, money, and materials.

It must be confessed, that since the great fire of London, 1666, many excellent laws have been enacted for the public safety, in order to prevent the fatal consequences of destruc-

destructive fires. These statutes are principally directed to proprietors and builders of houses for their conduct, and to prevent erections of wood, and using such a quantity of that combustible matter in their buildings as has been, at present is, and will be till prevented, by greatly curtailing such vast quantities of fiery turpentine, or timber, as are laid in every new erection. Our intention is to shew, or endeavour to illustrate, what little regard is paid to those salutary laws, even by the greatest bricklayers and carpenters in London ; and this we propose to do by examples from new erections of their own ; besides quotations from the principal statutes relative to this subject : with some observations and improvements on ambiguous words, which the cunning and ingenious well-fee'd counsellors never fail to bring, with all their oratory, when the builders are attacked on the statutes.

The first example of an illegal house we shall take notice of, is that pretty white one, upon an entire new construction, on the highest ground in the Green-Park, in the
eye

eye of the palaces! which has been in agitation between three and four years. This famous building (except six feet immediately above the ground, which is bricks and stone, and the central parts which front Lord *Cholmondeley's* house to the north) are all wood covered over with plaister, contrary to the statutes relative to this subject, which will more fully appear by and by in our quotations, particularly that of Anno Reg. VI. &c.

Before we begin our literal quotations from the statutes, we shall give another example of one of the finest rooms, perhaps, in St. James's parish, which is connected with, and adjoining to the back of the great assembly-room, in King's-street. Their doors are pierced through the great brick wall of the latter, for conveniency to both. This elegant room was finished December 1767; and being now out of all danger of information, either to hurt or affect it in the least degree, or those eminent workmen who built it*; we shall, for the public good,

* No action can legally be brought, but within

good, and those who may be tempted hereafter to act so contrary to all common honesty, but also in contradiction to all the statutes on the subject of building, give a little description of it, and the unjustifiable means they used to accomplish that end, viz. of building this pretty place for the most laudable purposes to be sure——

A stable and hayloft belonging to a neutral person* (not near so great a man as any of these builders, nor even the proprietor of the great room † himself) standing and joining to this proprietor's stable, only divided by a party wall, in common to both stables; he, in conjunction with his eminent builders (and contrary to all the warning given them of their illegal proceedings) took away this party wall, incroached eight or ten inches on the foundation six months after the facts, or finishing of any illegal erection. Act of Geo. III. Anno 6. p. 657.

* Had a lease of the premises at that time (1763) of 13 years unexpired.

† Built 3 years before, entirely by subscription.

dation

station of this neighbour's stable, from front to rear, by which they enlarged their kitchen, and built a new wall in its place. This new wall they only carried up about 20 feet high, until it came equal with their joists and flooring, or parallel with the floor of their great room, which fronts King's-street. Not only here is the encroachment unjustifiable, but they should have carried this party wall upright, through all the stories, as the statute directs, viz. * That they paid no regard to in the least; but on the level of it, when it came parallel with the floor of their great room, they laid four great girders and twenty-one small joists both on the top of this wall, and on the upper story, all hanging over the wall between four and five feet, and over the roof of their neighbour's stable and haylofts. On the extremity of these illegal girders and joists, they made the largest wooden wall, perhaps, in London, built since the great conflagration, and covered it in the finest manner plaister

* Act Char. II. chap. xvii. & xix. and also by an Act of Q. Ann. anno 6.

could do, in direct contradiction to the true spirit of every act on the subject, particularly those of Geo. III. chap. xxxvii. page 652. and that of Geo. III. anno 4.

These recent instances are sufficient to shew the little regard the principal builders in this great metropolis pay to the established laws of their country, there being but few streets in it, of any consequence, where there is not illegal bows or unwarrantable projections. If a maggoty landlord or tenant takes it in his head that he is not sufficiently seen from the window, especially when his head is just finished by a French hair-dresser, the best carpenter and bricklayer that he knows are directly sent for; down comes the front of his house in a mighty hurry, and bow-windows are erected in prodigious haste, without paying the least regard either to the complaints or damage of his neighbours, though he often affronts them all.

We shall now, for the entertainment of our curious readers, give a few interesting quotations from the statutes themselves, particularly

particularly that of Q. Ann. anno 6. chap. 31. entitled, *An Act for the better preventing of mischiefs that may happen by fire.*

“ Whereas many fires have lately broke
 “ out in several places, in and about the
 “ city and liberty of Westminster, and
 “ other parishes and places comprized with-
 “ in the weekly bills of mortality, and
 “ many houses have frequently been burnt
 “ and consumed, before such fires could be
 “ extinguished, to the impoverishing and
 “ utter ruin of many of her majesty’s sub-
 “ jects; the rage and violence whereof
 “ might have been in a great part prevent-
 “ ed, if a sufficient quantity of water had
 “ been provided in the pipes lying in the
 “ streets, and if party walls of brick had
 “ been built between one house and ano-
 “ ther, from the foundation to the top*,
 “ and less timber in the fronts of the
 houses :

* The great wooden plaister-wall of the new room behind the great assembly-room in King-street, St. James’s, of which we have taken some notice before, falls under this censure; for though it does not join to any house, yet it is infinitely worse, and more

“ houses † : For preventing the like mis-
 “ chiefs for the future, be it enacted by
 “ the Queen’s most excellent Majesty,
 “ by and with the advice and consent of the
 “ lords spiritual and temporal in the pre-
 “ sent parliament assembled, and by the
 “ authority of the same, that from and
 “ after the 25th day of March, which shall
 “ be in the year of our Lord one thousand
 “ seven hundred and eight, &c.”

The third paragraph of the same act, is
 as follows : “ And be it further enacted, by
 “ the authority aforesaid, that from and
 “ after the first day of May, which shall be
 “ in the year of our Lord one thousand
 “ seven hundred and eight, all and every
 “ house and houses which shall be erected

liable to censure ; being exposed not only to all ex-
 ternal accidents from haylofts in that yard, but
 hangs over between 4 and 5 feet, contrary to the
 true spirit of every act relative to the subject. These
 haylofts and stables at that time belonged to C. C.

† This same illegal plaistered wall, and the east
 end, which is mostly wood plaistered, falls under this
 predicament also.

“ and built, either upon old or new foun-
 “ dations, in any place or places in and
 “ about the city of London and Westmin-
 “ ster, or other parishes or precincts, com-
 “ prized within the weekly bills of morta-
 “ lity, shall have party walls between house
 “ and house, wholly of brick or stone, and
 “ of two bricks in the cellar and ground
 “ stories, at least, and thirteen inches thick
 “ upwards from the foundation, quite
 “ through all the stories of each house, and
 “ thirteen inches above the roof*. And
 “ that no modilion, cornish, timber, or
 “ wood under the eaves, shall hereafter be
 “ made or suffered in any such new house
 “ or houses; but that all fronts and rear-
 “ walls of every house or houses, shall be
 “ built of brick or stone †, to be carried
 “ two

* The party walls of all houses are improved by
 the acts of Geo. III. anno 4 & 6. from 13 inches
 at bottom to two bricks and a half thick, makes 22
 inches, besides the mortar; and 18 inches above the
 roof or gutter, which parapet must be covered with
 stone or good brick.

† Here again the plaister wall is condemned; and this,

“ two feet and a half high above the garret
 “ floor, and covered with stone or brick * :
 “ and if any new house or houses, shall,
 “ from and after the said first day of May,
 “ be erected and built within the places
 “ aforesaid, contrary to the true intent and
 “ meaning of this act, that then the owner
 “ of every such house, and head builder,
 “ or workmen, who undertakes such build-
 “ ing or work, shall each of them forfeit
 “ and pay for every such default, the sum
 “ of fifty pounds, to be equally divided :
 “ one moiety to the informer, and the other
 “ moiety to the poor of the parish, wherein
 “ such building shall be erected ; and to be
 “ levied, by warrant, under the hands and
 “ seals of two or more of her Majesty’s
 “ justices of the peace within the place

with the foregoing anecdotes, involves the fine white
 house in the Green Park, under the same predica-
 ment.

* Almost all the common houses are capp’d with
 large deal yellow boards of two or three inches thick,
 and painted like stone capping, and divided like the
 joints of the stone,

“ where

“ where such buildings shall be erected, or
 “ where such workmen shall inhabit, by
 “ distress and sale of the offenders goods,
 “ upon the conviction on oath, or upon the
 “ view of one or more such justices of the
 “ peace *, rendering the overplus to the
 “ owners (if any be); and for want of
 “ such distress, the offender shall be impri-
 “ soned by warrant from the said two jus-
 “ tices, who are hereby impowered to issue
 “ such warrant until payment as aforesaid.
 “ And the share of such forfeitures appoint-
 “ ed to go to the poor, as aforesaid, to be
 “ paid into the hands of the churchwardens
 “ of such respective parish, where such of-
 “ fence shall be committed, who are to
 “ give a receipt for the same; and to be
 “ charged therewith, and accountable for
 “ the same, in like manner as the other
 “ monies which they shall receive for the
 “ use of such parish.”

* Several justices of the peace were called upon
 to view the illegal erection in Rose and Crown
 yard, who promised to do as they are bound, under
 severe penalties, but never were so just as to obey
 either.

Anno Regni 4^o Georgii III. Regis, page 262, is as follows :

“ And whereas it would tend greatly to
 “ prevent the fatal consequences of fire
 “ spreading and communicating to adjoin-
 “ ing houses, within the said city, parishes,
 “ and precincts, and other the limits afore-
 “ said, if party walls between house and
 “ house within the same, were to be made
 “ of greater thickness than is prescribed by
 “ the act passed in the seventh year of the
 “ reign of her late Majesty Queen Anne,
 “ intitled, *An Act for making more effectual*
 “ *an Act made in the Sixth Year of her said*
 “ *Majesty's Reign, for the better preventing*
 “ *Mischiefs that may happen by fire.*

“ And if no timber, except the timbers
 “ of the girders, binding joists, and the
 “ templets under the same were laid into
 “ party walls ; and if no timbers of the
 “ roof were laid into the party walls (ex-
 “ cept the purlins and kirb thereof) : and
 “ if the ends of girders and binding-joists
 “ lying within the said party-walls, did
 “ not

“ not exceed one foot ; and if none of the
 “ ends of girders or binding-joists in adjoin-
 “ ing houses, meet, or were laid opposite
 “ to one another, and the sides thereof
 “ were laid at least fourteen inches distant
 “ from each other ; and if there should be
 “ nine inches at least of solid brick-work
 “ left, or between the ends of all lintels,
 “ wall-plates, or bend timbers, which may
 “ or shall be laid, in or upon the walls of
 “ the fore and back fronts of all houses
 “ which shall adjoin to each other.

“ Be it therefore enacted, by the autho-
 “ rity aforesaid, That all party walls which,
 “ from and after the expiration of three
 “ calendar months, next after the passing
 “ of this act, shall be erected or built with-
 “ in the said city or liberty of Westminster,
 “ and the parishes, precincts, and limits
 “ thereof, as aforesaid, shall be two bricks
 “ and a half thick in the cellars at least,
 “ and two bricks thick upwards, to the
 “ garret floors ; and from thence one brick
 “ and a half thick, or eighteen inches at
 “ least above the roof or gutters which ad-
 “ join

“ join to such party walls ; and that the
 “ same shall be built of stone, or of good
 “ found burnt bricks, and no other.

“ And be it further enacted by the au-
 “ thority aforesaid, that from and after the
 “ expiration of the said three calendar
 “ months, no timbers, except the timbers
 “ of the girders, binding-joists, or templets
 “ under the same, shall be laid in any party
 “ walls erected or built, or to be erected
 “ or built within the said city or liberty of
 “ Westminster, and the parishes, precincts,
 “ and liberties as aforesaid ; and that no
 “ timber of the roof be laid in such party
 “ walls (except the purlins or kirb there-
 “ of) and that the ends of all girders and
 “ binding joists lying within such party
 “ walls, shall not exceed nine inches ; and
 “ that none of the ends of the girders or
 “ binding joists in adjoining houses, shall
 “ meet or be laid opposite to each other :
 “ and that the sides of each shall be at least
 “ fourteen inches distant from each other ;
 “ and that there shall be nine inches at least
 “ of solid brick-work left at, or between
 “ the

“ the end, of all lintels, wall-plates, and
 “ bound timbers, which may or shall be
 “ laid in or upon the walls of the fore and
 “ back fronts of all houses which shall ad-
 “ join to each other.

“ And if any head-builder, master brick-
 “ layer or workman, shall erect or build, or
 “ cause to be erected or built, any party-
 “ wall within the said city and liberty of
 “ Westminster, and the parishes, precincts,
 “ and limits thereof, as aforesaid, contrary
 “ to the directions, true intent and mean-
 “ ing of this act; or shall use in the build-
 “ ing thereof any bricks other than good
 “ sound burnt bricks, or shall lay any tim-
 “ ber in any party-wall * erected or built,
 “ or which shall be erected or built within
 “ the said city or liberty of Westminster,
 “ contrary to the directions, true intent and

* All the great timbers, girders, and joists, with
 thousands of feet of quarters, and a hundred thou-
 sand feet of lath, contained in the great south plaister
 wall of the new fine room behind the great assembly-
 room in King's-street, St. James's, are condemned
 by this statute, though the head carpenter of this
 erection had a principal hand in this improved act.

“ meaning

“ meaning of this act, then such head-
 “ builder, master bricklayer, or workman,
 “ shall, for every such offence, forfeit and
 “ pay the sum of fifty pounds : one half to
 “ the poor, and the other to the informer,
 “ upon conviction, and the overplus (if any
 “ be) to the defendant,” as in the former
 quotation of the 8th of *Queen Anne*.

Anno Reg. 4° Geo. III. p. 265.

“ And be it further enacted by the au-
 “ thority aforesaid, that every master buil-
 “ der who shall, after the first day of July,
 “ one thousand seven hundred and sixty-
 “ four, erect or build any house within
 “ the limits abovementioned, shall, within
 “ fourteen days after the same is covered in,
 “ cause the same to be surveyed by one or
 “ more surveyor or surveyors ; and such sur-
 “ veyor or surveyors shall make oath before
 “ one of his Majesty’s justices of the peace
 “ for the said county of Middlesex, or city
 “ of Westminster (which oath such justice
 “ is hereby impowered and required to ad-
 “ minister) that the same hath been, to the
 “ best

“ best of their judgment and belief, built
 “ and erected agreeable to the several di-
 “ rections in this act contained ; which affi-
 “ davit shall be filed with the clerk of the
 “ peace for the said county of Middlesex,
 “ within ten days after the making thereof ;
 “ and the said clerk of the peace shall have
 “ for his fee and trouble therein, one shil-
 “ ling, and no more.”

N. B. The two fine houses in question
 were never sworn to, or else perjury
 had been added to the transgressing
 of the laws.

“ And if any master builder shall make
 “ default in the premises, by neglecting to
 “ cause such survey to be made, and such
 “ affidavit to be made and filed as aforesaid,
 “ such master-builder shall, for every such
 “ neglect and default, forfeit fifty pounds,
 “ to be recovered and applied in the same
 “ manner as any penalties and forfeitures
 “ are by this act directed to be recovered
 “ and applied.

“ And be it further enacted, by the au-
 “ thority

“thority aforefaid, that the parifhioners
 “and inhabitants of the parifh, liberty, or
 “precinct, where any offence againft this
 “act fhall be committed (except perfons
 “receiving alms) fhall be admitted and al-
 “lowed witneffes, notwithstanding his, her,
 “or their being a parifhioner or parifhioners,
 “inhabitant or inhabitants, in fuch parifh,
 “liberty or precinct.”

The many excellent improvements made
 on the ftatutes for preventing the fpreading
 of fires, fince the great one of London,
 1666, cannot be too much admired; more
 efpecially thofe, from which the foregoing
 abftracts are taken: we fhall add but a few
 more, which are emendations on all the
 former, as it is written in an act of our pre-
 fent Sovereign, in the fixth year of his
 reign, chap. xxxvii. p. 655. viz.

“And be it further enacted, by the au-
 “thority aforefaid, that if any head-builder
 “or mafter-bricklayer, fhall, from and
 “after the firft day of June, one thoufand
 “feven hundred and fixty-fix, erect or build
 “any houfe or houfes, within the faid city
 “or

“ or liberty of Westminster, or cause any
 “ house to be erected and built there, with-
 “ in any of the parishes, precincts, or limits
 “ as aforesaid, contrary to the direction of
 “ the said recited act, or of this present act;
 “ then every such head-builder or master-
 “ bricklayer shall not only pay the penal-
 “ ties whereof he or they shall be con-
 “ victed, but also shall, within the space of
 “ six months next after his or their being
 “ convicted of such offence, in manner by
 “ the same recited act prescribed, make
 “ good all such defects and irregularities
 “ whereof he or they shall have been so
 “ convicted, and render the building of
 “ such house or houses conformable to the
 “ directions of the said recited act. And
 “ in case such head-builder or master-
 “ bricklayer shall not, within six months
 “ after such conviction, have made good
 “ such defects and irregularities, and ren-
 “ dered the building of such house or
 “ houses conformable to the directions of
 “ the said recited act, or of this present act,
 “ then every such head-builder, master-
 “ brick-

“ bricklayer, or workman, shall forfeit the
 “ further sum of fifty pounds, to be applied
 “ as aforesaid, and to be likewise levied and
 “ recovered in manner as by the said recited
 “ act is directed. And so *toties quoties* for
 “ every six months that such defects and ir-
 “ regularities shall continue, and such house
 “ or houses remain, built otherwise than
 “ conformable to the directions of the said
 “ recited act, or of this present act.

In page 657, it is ordered,

“ And be it further enacted, by the au-
 “ thority aforesaid, that if any action shall
 “ be brought, or suit commenced, against
 “ any person or persons, for any thing done
 “ in pursuance of the said recited act of the
 “ fourth year of his present Majesty, or
 “ of this act, such action or suit shall be
 “ laid or brought within six months next
 “ after the facts done, and not afterwards;
 “ and shall be laid or brought in the county
 “ or place where the fact was committed,
 “ and not elsewhere: and the defendant
 “ or defendants in such action, may plead
 “ the general issue, and give this act and
 “ the

“ the special matter in evidence at any
 “ trial to be had thereupon, and that the
 “ same was done in pursuance and by the
 “ authority of this act. And if the same
 “ shall appear to have been so done, and if
 “ any action or suit shall not be brought
 “ within the time before limited, or shall
 “ be brought in any other county or place
 “ than as aforesaid, then the jury shall find
 “ for the defendant or defendants: or if the
 “ plaintiff or plaintiffs shall become non-
 “ suited, and suffer discontinuance of his or
 “ their action or actions, or if a verdict shall
 “ pass against the plaintiff or plaintiffs,
 “ the said defendant or defendants shall
 “ have triple costs; and shall have such re-
 “ medy for recovering the same, as any de-
 “ fendant or defendants hath or have for
 “ costs in any other case by law.

“ And it is hereby further enacted, that
 “ this act shall be deemed and taken to be
 “ a public act; and shall be judicially taken
 “ notice of as such, by all judges, justices,
 “ and all other persons whatsoever, without
 “ specially pleading the same.” End of
 the act of 6 Geo. III.

It is observable that almost all the new projecting bow-windows through this metropolis, are erected with wood plaistered over, contradictory to all the laws on the subject of building for preventing the spreading of fires; and not only so, but all the window frames are set nearly flush with the fronts of their plaistered walls, and on the joists or girders projecting four or five feet beyond the main front of the house; and these joists parallel with one another, occupy a double office both within and without the house. *Vide the last paragraph of the Act of the 7th of Q. Anne.*

“ Be it enacted by the authority aforesaid,
 “ that from and after the first day of June,
 “ one thousand seven hundred and nine, no
 “ door frame, or frame of wood to be used
 “ in any house or building which shall be
 “ erected on either old or new foundations
 “ within the aforesaid city and liberty of
 “ Westminster, or the liberties thereof, shall
 “ be set nearer the outside of the wall than
 “ four inches.” Three months imprisonment
 is annexed to the transgression of this statute
 without bail or mainprize.

A single observation more or two on this interesting subject, principally addressed to the Great, both in town and country, who have numerous families.

As it is even in idea terrible, that so many people should be permitted to sleep in the night all at the same time in one house, without one or more awake, to be guardians (under Providence) of the rest, as is practised on shipboard at sea by every captain or master, unless he be a fool or an idiot *; how much it would contribute to the ease, happiness, and advantage of the whole family, especially the lord and master of it, if one or two of his most vigilant and trusty servants were appointed for that end; and had master-keys, such as his lord or 'squire were pleased to trust him with, by which, both night and day, that servant might examine every apartment of the house or

* It is not in the least to be doubted, but that many ships, with all their crews, &c. are utterly lost by intemperance and bad watchmen. The first renders good sailors no better than fools; and if you bray a fool in a mortar, his folly will still be the same.

houses, within and without doors, on all occasions whatever, hardly any seasons excepted; but most of all when any workmen are about, or more particularly working in the the house. But above every other consideration imaginable, let this principally take root, and be deeply engraved in the faithful memories of our great people, that these precautions be for ever put in practice at all times and seasons, both nights and days, holydays * and sabbaths not excepted——

* Early in the morning of the 27th of July, 1770, in Portsmouth dock-yard many fatal fires broke out in several places among the masts, ropes, flax, pitch, and other warehouses, which raged with irresistible fury for six or eight hours, the tide being at low ebb, and the yard empty of the men; six or seven hundred of them being gone to a fair eight miles off. This they call a holiday. The damage is computed at the smallest rate at fifty thousand pounds.

N. B. Such another scene was exhibited on this same day of the year in this very dock, about ten years ago. *O publish it not in Gath! Ah shame to men!* Milt.

It is a lamentable truth that many watchmen, both in church and state, are well paid, though they do little or nothing but mind their own secular business, instead of their flocks. *Mait.*

when

when the carpenters and painters are just going away.

If our own particular servants can but be relied on, even when they have particular directions for watching night and day over both men and their operations, how little the latter ought to be depended upon who rejoice in mischief of the most destructive kind, is open and apparent to every intelligent mind.

It is also most seriously recommended to these faithful inspectors or guardians of the night, that in every room they enter, they examine, with the strictest attention, every fire-place and its chimney and funnel, not only by the eye, but particularly by the smell.

Had these or some such like precautions been put in practice fifty years ago, by the opulent people of these nations, millions had been saved, and likewise many lives. Besides rendering insurance offices of little use, and enabling the master of the family amply to reward his faithful watchmen.

Vive vale si quid novisti rectius istis,

Candidus imperti, si non his utere mecum.

HOR.

On Monday morning the 24th of September, 1770, the back apartments of Sir Sampson Gideon's house were set on fire, (whose main large front faces St. James's-square, the corner of York-street) whereby several elegant rooms were all burnt down. This fire began in a chimney, by means of a blowing stove, which had set fire to some foot lying in a hole, or at the end and vacuum of some timber carried too near the flue; a practice too frequently used by dishonest and unfaithful carpenters, who take delight in such dreadful machinations as fatal fires. One of Sir Sampson's servants told me he lay in the room that night where the fire begun, and was almost stifled before he could get out (which was about three in the morning) and that eleven more of the servants had slept in the house the same night. The painters had just finished their work, and been extremely busy all the preceding day (though the sabbath).——Fires had been kept in the chimnies of many of the apartments several weeks before, though embrasures
are

are infinitely safer, and better for discharging the smell of the paint. No precautions are adequate to ignorance and carelessness to be sure; for had the last observation in this small treatise (addressed principally to the Great) been observed, and but one of the dozen servants who slept in the house that night had been ordered to watch, or rather to walk from room to room, and carefully observe every flue and chimney in the best manner by but two of his senses, smelling and touching *, this misfortune, and the great inconvenience to the master and family, had been prevented.

What has been said on the subject of building in general, and on this most interesting one in particular, building houses that are not capable of being destroyed by fire, &c.; the extracts taken from the principal laws themselves relative to building, and preventing the extension of fatal fires; for directing brick-

* By firing a pistol, (or more, if need be) loaded with powder only, up any chimney that is on fire, it will presently, by the explosion, extinguish or bring down all the soot, and save a deal of trouble and confusion.

layers and carpenters in their operations; the observations made on their frauds and illegal practices; their ignorant and careless laying timbers too near funnels; their too frequent encroachments on neighbouring premises, &c. &c.; and our anecdotes on some famous erections, being collateral subjects, will, by the publication, we humbly hope, be of some use to the public, particularly the ingenious: to others, who care not for improvement, despise instruction, and abhor correction, we pray they may not escape without partaking some of the fruits of their labours, and be made sensible of the meaning of those laws which they have so often, so audaciously, slyly, and wantonly violated.

We now come to the second proposition, which is to point out the most effectual methods, by which new chimnies in all good houses may be so erected, as to draw well, and not prove smoky ones.

And as this most desirable object depends on true philosophical principles, matter and motion, we cannot admit a doubt, had

any of the eminent philosophers, a Bacon, a Newton, or a M^cLaurin, entered upon it, or truly considered the infinite advantage such a subject, well displayed, would have contributed to the health and spirits of the great and opulent, they would have left such directions, if properly pursued, that hardly a nobleman or gentleman's house in Great Britain would be deemed an unwholesome or smoky one.

And, as the intentions of the author of this essay are principally meant for the public safety, and to inspire some able hands to prosecute subjects of such importance, hitherto so surprisingly neglected or overlooked; if ever he is so fortunate as to see any fine genius prosecute them, the greater part of his intentions will be completed, and he will rejoice in the little pains, at leisure hours, he has bestowed in breaking the way for those who are blest'd with time and excellent abilities.

It must be confessed, the ancients had many excellent notions on most subjects; and in their buildings endeavoured to shun the
greater

greater inconveniencies : for many of the funnels of their chimnies yet remaining, are thirty inches deep, and most unaccountably wide from right to left, and mostly placed in the corners of all their houses. To avoid a smoky one, they seem to have sacrificed all symmetry and proportion ; and when they placed their chimnies in the center of their best rooms, they projected them so far within the rooms, as seems an undoubted proof they could not help believing that deep funnels were absolutely necessary for preventing a smoky house.

The moderns seem to have run into the other extream ; and for the sake of good room, order, and regularity in their apartments, give their chimnies so little draught, that there is so scanty a space from breast to back, of about 12, 14, 16 or 18 inches at most, that it is hardly possible for few or any of them but must prove, as they do, smoky ones.

This is plain, without contradiction, by the numbers of earthen pots set on the tops of almost all the new chimnies which have been

been built for these 30 or 50 years backwards*.

To avoid extremes being the safest way on every subject, the true medium or method whereby chimnies may be so built as neither to spoil the rooms by their sizes, nor prove smoky ones, is our chief intention. Neither is it more surprizing the smoke proves so reluctant to ascend the funnels of the chimnies built so unreasonably shallow as the present mode is, than to see a guinea drop to the bottom of the exhausted receiver with the same velocity as a feather; because all bodies, in proportion to their density or weight, require a greater force to pass through the medium of air when ascending, than descending. How unreasonable is it to expect, in rooms so unaccountably close, where the air is almost entirely shut out, as in most of our modern great

* Witness the Admiralty, below Charing-cross, where such additions of various kinds are built on the old chimney tops, as are to be found no where else; all occasioned by the shallowness of their funnels below, and narrowness at top. And it is a question still, whether they have mended their going to this hour.

houses,

houses, that the smoke will ever reverberate, when it has so little or no impelling power to force it up the funnels.

This seems to want but little illustration, as every part of nature proves it : the flowing of the tide stops and repulses the currents of the rivers, in proportion to its superior strength ; and when that loses itself, the natural currents of the rivers take place again.

In the section you see the size of the modern chimnies in front, but all the funnels are upon a new plan. The old plans being found, by long experience, almost all defective.

Let therefore the funnels widen as they ascend, especially from right to left, and be at least 20 or 22 inches depth ; throw arches over from the front of the inside of your chimney, to the back, and carry the insides up slanting, filling up the vacuums as you go up, to prevent the soot from resting on any square or flat whatever : our depth being ascertained to 20 inches at least, the width from right to left need be no more than

than 12 or 14 inches at most, as you see demonstrated in the chimnies of our parlours and first floors Z Z.

Three funnels are drawn in the chimney of the kitchen *, and intended to be arched as the others. The smoother the insides are, the better; for all roughness retards and hinders the ascending smoke, and renders them almost impossible to be kept clean, which is absolutely necessary to prevent them from smoking.

And if gentlemen of distinction would cause all the funnels of their chimnies to be built of solid stone, the thing would certainly be done to the purpose.

To prevent the smoke of one chimney being blown down another (a very common case) where there is no fire, let the tops of all your new chimnies be carried eighteen inches above the stone capping or cornice,

* This idea we do not insist upon; but knowing that so many kitchen chimnies are very smoky ones, by reason of their width below; that width divided into three, and falling into the main funnel, may prove like three bellows in place of one, and be of great service.

separat-

separated from one another, and finished all square, to prevent the whistling when the wind blows hard. These square tops, tho' they occupy more space, must widen towards the top, as the slant from bottom to top of our plan in the section directed as at O O O O O.

And let all builders strictly observe to set their bricks or stone with the best lime or tarras with the spirit and fire in it; for if the air penetrate from without or within, and communicate with one another, that chimney or chimnies can never go well.

For a further illustration of our hypothesis or plan; as all smoke is water rarified by the force of fire, they being originally one, may justly be compared in their operations to one another. For example: When a powerful body of water is let out from any height, with what irresistible force it carries every weaker body along with it; but when dilated and expanded, loses its force, like a powerful army of soldiers broken and divided. So by the contraction of the funnels of our chimnies at bottom, and their uncom-

uncommon depth, we gather all the circum-ambient air the room affords in one body or column ; and if there be any occasion for more air, as is often the case, by reason of the closeness of the doors and windows, especially when the fires are lighting up, let some of them be a little opened ; more strength will be added to the natural air of the room, which will impel the new-created smoke with more force and celerity ; and considering, as it ascends, it has the more space to occupy, as our chimnies grow wider and wider, the smoke weaker and thinner, still impelled by the stronger body behind, this will prevent any reverberating smoke coming down into the apartments, and discharge itself in the air, to the satisfaction, health, and spirits of the inhabitants below ; which is the desired end of this original plan.

In our third proposition we promised to lay down the best and most effectual methods how to cure all smoaky chimnies, if they were not so bad as to render them incurable by age, ill usage, or their unlucky situation,

If the fronts of your chimnies are too large, they must be contracted to the modern sizes, as in the drawing. First pull down as much as in the plan directed, that you may be enabled to form your flanks and throw over your arches, leaving no flats in your flanks, but carrying them up as far as necessary, that the foot may not rest in quantities, or be attended with any inconveniences; then you may set your chimney jambs where you please. This method only followed, has, to my own knowledge, proved of great benefit to many, who were before greatly distressed beyond all patience imaginable.

I have set a breast-plate of iron of sixteen inches breadth, and five feet or more in length, resting on each flank of the chimney within, and placed two inches distant from the breast: it proved of use, but have since found the above plan infinitely preferable.

Another, and the least expensive experiment I have tried in my own house, on intolerable smoky chimnies, by only contract-

5

ing

ing the fronts of them to the breadth of the range from right to left, from 12 to 24 inches, agreeable to the size of the room, and in height only three feet, leaving the old fronts or jambs of your chimnies just as they were, and the new fronts two inches within them, forming a square all round, which you may ornament with marble or fine Dutch tiles at pleasure ; then setting an earthen pot on the top, succeeded far beyond my expectation : but this pot is very troublesome, by reason of the fur or soot that so soon gathers therein, by the frequent fires : for it is not more than ten inches diameter, and considerably smaller than the top of the chimney ; whereas it should be larger than that funnel on which it rests ; and instead of being contracted in its width, should be extended towards the top, by which the smoke would have the more room to discharge itself in the air, and consequently lose its force and be the more incapable of reverberating in the other funnels, and down to the adjoining rooms, as is commonly the case of all chimnies of the modern construction.

I have known these pots so furred up with constant fires in two months, that the sweeper could hardly get his hand through; which, when cleaned, all was well again. A little experience will prove these things beyond a doubt. Besides, if these pots were made wider at top than bottom, as before observed, and larger than they commonly are, even as big as the chimney can well bear, or about 12 or 13 inches diameter, they would answer still better than they do, and would not fur up so soon, or want such frequent cleaning as they absolutely must have. And if they were cast square instead of round, and widening at the top rather than the bottom, the whistling which is created by a high wind, playing round the cylindrical top, might be prevented, if not perfectly, yet in a great measure. I have known cylinder pots, though of great use respecting the smoke, taken away entirely for the whistling noise they make in windy weather. If they are well fix'd by able workmen, with the best tarras or lime, it will keep them safe from being blown off,

as well as if they were round. The rich and opulent who do nothing, and will not employ themselves, are seldom easy, and too seldom pleased. Good spirits, the greatest blessing heaven can bestow on the rational creation, seldom fall to the share of the indolent, be they ever so rich. The rich, though unhappy, by virtue of their superabundance, would by no means, or for any consideration, change circumstances with the poor, or even with those in middle circumstances. But this I believe, that if those who are in necessitous circumstances were able to change with the rich, they would be still more unhappy than they are at the present time, though it is impossible to make either believe these truths.

Qui fit Mecenas ut nemo. HOR.

If the funnels of your chimnies are any of them on the outside walls of your houses, and you cannot think of either the fronts within, or the tops without, being disfigured, and the expence saved by the foregoing rules, let a very small hole be pierced two or three feet above the fire-
F 3
place

place in the room from without; sloping as much upwards as possible, as marked in the drawing of the three funnels of the kitchen chimney Y Y Y. This easy experiment has been found of surprizing benefit; and if it should introduce too much air, or prove too cool for bettermost rooms, it is filled up in a few minutes. Many apply this remedy to the top of their chimnies, because they cannot get lower; their funnels being all within the house, and receive much benefit from them, though they are intolerably ugly, and deform all the outside with smoke. But as for this experiment *,

* If this hole be ever so small, and rightly directed, it will be found of much more service than those are, whose size are ten times bigger. The benefit arising from so trifling an operation below, will not be justly known until the wind has been in every corner, I mean in every principal point of the compass; for I have found by experience that hardly any scheme answers equally to all. If it answers to three points, and proves defective in the fourth, the owner of the houses must determine the thing; and if it be found of real use, and at any time after choaked up, it may be easily cleaned by the augur that first bored the hole, or a small spit.

it was seldom heard of till now, though it is founded on reason and the nature of things.

When reason and art go hand in hand, and are justly conjoined, you may rely on that operation to answer the intended purpose the best; for if your house and chimney tops be lower than the adjoining houses and chimnies, you are badly situated indeed; and it is ten to one but you must raise yours to the level with your neighbours, or never be effectually cured.

When the wind blows parallel with that higher eminence and the tops of your chimnies, the smoke that comes from the lower chimney being obstructed in its natural course, like a ball, reverberates and forces its passage down the same funnel from whence it came, having no stronger power to oppose it; neither fire enough, nor strength of air, which are both absolutely necessary in such a situation.

I have seen tops of chimnies raised to a very dangerous height, almost without a possibility of being supported, or tied with iron

spars; and tin funnels of 12 feet long placed on these dangerously raised tops, before the people could live in their own houses. But this high chimney, so enormous in its kind, so dangerous, and to the last degree foolish, is such, that no sensible thinking person would live in that house on any consideration. One of these stands in King's-street, St. James's, at the end of the great assembly-room: it has stood these four years, but it is very amazing it was not blown down the first high wind that took its broad-side.

Many are the dangerous and too high chimnies in London, and it is miraculous that we are seldom visited with storms or hurricanes; for was one to happen, as God forbid, few or none of them but must inevitably perish!—And if people, whose houses are over-top'd by any new erections, would act consistently with reason and their own safety, let them try any expedient whatever, but not build in contradiction to all the reason and common sense in the world. Needy people are glad to find a house where money has been got before them;

them ; but have neither prudence nor understanding to reflect on many dangerous circumstances with which they are environ'd. It is incredible to believe the sums of money that have been expended in London to cure smoky chimnies, and often to little purpose but being plagued with dirt and blundering workmen, who know very little of the causes or effects of any part of matter, so that it is merely chance if at any time they accomplish the end.

By removing the cause, the effect will cease. If a fire be lighted in the middle of any apartment, will not the smoke expand itself all over the same ; but if a fire be put in its proper place, and the chimney fronts, funnels, and tops, be constructed agreeable to the directions of this little treatise, no doubt you may have clear and wholesome rooms, the thing desired.

And as examples are the most powerful monitors on most subjects, the ingenious reader may, at his conveniency, view the strangest, the oddest, the ugliest erections, raisings, or works, added at various and different

rent times, to the tops of the Admiralty chimnies, which undoubtedly cost more money than would have built a good house; but the worst is, all to little purpose.

Many blunders might be pointed out in the great and public works through the kingdom: all the sashes of the first floor of that grand edifice are sunk into the bottom stone or sill, six or eight inches*; if one was on a parallel with them, on the other side of the way, he would clearly see into the extent of this absurdity, but from the street they appear twice as large; the rain that beats against these windows is discharged by a pistol bore through the stone sill, which is hollowed like a trough, six inches deep, and runs down the fronts of the main wall, leaving a dirty mark all the way.

Another remarkable piece of art is shewn in the four stately columns that carry the portico in the center; for these columns are

* This was a remarkable blunder between the surveyor and the workman; but seems to be placed to the account of the architect.

only one diameter too long in their shafts, which are four feet *.

The censorious may condemn these collateral observations, which the ingenious and candid will not disapprove, since they affect no character now living, and may be attended with real advantage to the public, if duly observed.

Before closing the subject, we shall illustrate the same with a fact which may be depended upon: A gentleman who had a house at the bottom of a hill or rising ground, whose heights were nearly equal, but the latter was higher than the tops of the chimnies. When the wind blew over this contiguous eminence, it blew the smoke back in such clouds, that there was no bearing any fire therein. Of this an account was written to this author, and he gave thereto the following reply:

* This falls likewise to the honour of the architect.—A proper pedestal cut in the column would reduce the shaft to Ionian size: and as the present times can boast of several architects of inimitable merit, I hope soon to see these preposterous monsters rendered a credit to the greatest and most ingenious people on earth.

S I R,

You do me much honour by the favourable opinion you have so politely expressed, and in desiring my advice, which I freely give, submitting it to your own better judgment.

I find that the house was built before it was yours, and that the fronts of all your chimnies are too large, and the funnels too shallow.

In order therefore to give you relief from a smoky and dirty house, which I know you abhor, let your chimnies be contracted in their front to the smallest modern size, proportioned to the rooms; for a room of 20 feet by 16, 3 feet 2 inches in height by 3 feet 4 inches in breadth.

But first, all the fronts must be taken down, and the funnels be contracted about 14 or 16 inches from right to left, the deeper the better. Throw arches over from front to back, and carry up sloping that the soot may not lie in flakes, as far as the workman can conveniently: perhaps this sloping will answer best on one side, only
the

the tops of your chimnies must be raised higher than the contiguous eminence ; for when the wind blows over, finding, as it were, a perpendicular opening, and the air collected into one column, it will be of vast force, especially when acting in one direction joined with the sun in his meridian : for his heat will over-power the natural body of air collected from the room below and the additional smoke, that it is no wonder if at such seasons, you were distressed with smoke and sulphureous vapours.

But in the first place, raise the tops of your chimnies a few feet, and make two small openings, one on each side, but not parallel with the distressing wind : cover the top with a large heavy flag stone, closely cemented with good lime or tarras, that it may be able to resist the wind, and not be blown off. By this, the perpendicular direction of the air will be prevented, and on whatever point the wind sets, there is a passage for the smoke, and a mean to prevent its reverberating into the apartments below ; as has been found to the singular advantage of many persons. If

If this experiment does not answer, make up the whole front of your chimney within two inches of the old jambs; a square of that depth will fall all round, leaving only the space of your grate for the opening, which may be from 24 to perhaps 15 or 16 inches, or more*; and let the height be from 30 to 36 inches, the lower the better; the lowest bar of the grate not exceeding 10 or 12 inches from the slab. By this plain method, and setting a pot of good dimensions on the top of the chimney, I have effectually cured several in my own house in King-street, St. James's, which were really intolerable.

The fronts of your new works may be covered with marble, or whatever is most agreeable to your fancy and taste.

The least expensive methods often turn out the best; I heartily wish this may be the case in yours; if not, when you have tried the easiest, and it does not answer, then let another be tried. I shall be glad to hear from you; and wherein I can con-

* This is meant only for small apartments.

tribute to the happiness of your family,
freely command

Your most obedient servant,

W. BENEVOLOUS.

In the 4th and last proposition we promised to instruct our readers how to prevent all vermin being introduced into houses, and clearing houses of them, and of destroying the worst kind, the bugs; a thing hitherto unattempted.

It is hard to ascertain how this species was first introduced into England: probably they came with the French refugees, who fled from the persecution of Lewis le Grand: they are so surprisngly prolific, that if they get footing into one room, they will, if not prevented with the utmost care and attention, soon spread through the whole.

Whoever would have clean houses, let them beware of introducing old furniture from any quarter: let the best workmen be always employed, particularly bedstead-makers, chair-makers and upholsterers, eminent for cleanness, and of a fair character.

Now

Now to make a bedstead, sofa, or chair, so as no vermin can exist in them; take the best English oak, or any other good sound wood, for your bedstead frames: take especial care that no cracks, holes, or splinters be in your whole piece of work; let both your head-board and laths be of oak, of a proper thickness, all well planed, smoothed, and neatly framed. Three days before you put up your bedsteads, lay them over in every part with a mixture of spirit of turpentine, mercury, and spirit of salt, all beat up well in a mortar; but more particularly prime all the mortices within very well, and all the ends of your tenons, and also the tops and bottoms of your posts, even before you put on the castors; this done, you may put up your bedstead and furniture, and be satisfied that no vermin will exist in the first, though in the second they possibly may.

Those who pretend to cure bedsteads and chambers from vermin, and do not take the bedsteads and furniture down, nor rip off the skirting, and even the top cornices of the warmest

warmest corners of the room, do only deceive their employers, like the quacks, who heal the outside of a sore, but leave the cancer-worm within; which, in a little time, breaks out worse than ever.

If any bugs be in a room, the beds there will never be clear, unless the warmest corners be taken down: if there be none at the fire side, or in the sunny corners, you may be sure there will be none in the cooler parts. I have known thousands on the back part of the skirting, which being pulled down, and carried into the back-yard, was laid over with spirit of turpentine, &c. well fired, and then set up again when there was an effectual cure.

Before you put up those parts of the wainscoting, let them all be well primed with the mixture abovementioned, and you will have good reason to expect a real remedy: but if these methods do not answer, it is owing to the oldness of the house, to which a new one must succeed as soon as possible.

If the furniture of any bed be of such a nature that it cannot be cleaned at home,

it must be sent to the best silk-dyer or scourer, and all the fringes and every part of it taken to pieces; without which, even they only who can do it, are unable to answer for its being done to perfection.

If any old bedstead, or even new be infected, let them be taken down throughout: let the whole be well prim'd, particularly within the mortises, with the spirit of turpentine, &c. then all fired and well scraped within the mortises with chissels; and before you put them up, be all primed with the mixture above prescribed. A good old bedstead, thus treated, will be little worse than a new one. But if you can spare your bedsteads for some weeks or months, commit them naked to the yard or out-house, which will be of singular use, excessive heat or excessive cold being the absolute cure of all vermin.

*How to know if there be Vermin in a Bed,
without taking it down.*

Unrip the furniture from the warmest top corner post of the bedstead; and with a lighted candle examine closely, for if any
be

be in the bed, that is their principal place. If you see none, rub the top of the bedstead pretty hard with your fingers, for there may be eggs almost invifible, which will smell as rank by ftrong rubbing, as if alive: for in warm weather, or in a warm room, they are foon difturbed, and quick in their motion.

By this method, you will fee in a minute or two the real cafe. I have known but one in a very fine bed, and that was brought in by a gentleman the firft night he lay in it: the bug, on examining the place, was detected; but no remainder was left behind, to the no fmall joy of the proprietor, a lady, who never had a fingle complaint of that kind thefe three years.

Thefe vermin lay their eggs in the warmef and fafeft places of beds and furniture; nay, in holes and corners: and if a male and female are introduced, they propagate furprifingly. Their eggs are firft white, and like fmall grains of whiting or chalk; but in a few days grow bigger, and perfectly black, like fmall grains of gunpowder; and

when they first begin to move, they are as complete and perfect in their parts, as when they arrive at their largest size, yet are but just perceptible by the naked eye. When they arrive at maturity, the male is larger than the female, but of a blacker brown: if two remain undisturbed for two summers, they engender thousands if the apartments be warm: but the cold destroys both them and their eggs, as it does every other thing. There are many skins which they will not touch: thick and dark skins are not their favourite soil: a stranger who has a fair skin, stands a chance of being bitten by them: several persons have in one night's time been so stung by them, as to be left next morning like one in the small pox, and in an high fever besides.

A gentleman travelling once thro' Italy, lay in as fine and clean apartments as could be, and on bedsteads of polished iron, drawn every night to the center of the floor of the room: he was often devoured, in a manner, by them; he averred, they dropped from the cieling, perpendicularly upon him,

him, and were often gone before he could get up, returning to their holes in the corners of the room, or cornices, where there might be some rends in the plaister walls.

Many beds have been hung like sailors hammocks, and yet the sleepers in them have been served the same way; but we hope that the remedies proposed will be duly attended to,

*How to cure Kitchens and lower Apartments
from Black Beetles.*

Take about 30 or 40 gallons of boiling hot water, and mix a quantity of limestone in it, until it be as thick as cream; then take four pounds of the coarsest brown sugar, and half a pound of arsenic; mix them all well, and keep them in quick motion, for the arsenic will preponderate instantaneously, unless it is prevented by very quick agitation; then take a squirting machine, and by it inject this in every corner and crevice of the kitchen or room where the vermin are: then float your kitchen with cold water, and two nights after take

coarse brown sugar mixed with arsenic, and lay all round the corners of the apartments, which will, if properly managed, destroy all both within and without. When you are clear of them, let the remaining lime and water be used in plaistering up every crevice and suspected place in the rooms. But if there be any wood in the floors or wainscoting of the rooms, under which the vermin find shelter, all must be converted into stone floors or plaistered walls, else our labour is vain.

As arsenic is a frightful name, I would recommend the above operations to be done in private, and when the family is out of town.

How to clear Kitchens from Flies.

Take of the same water prescribed for the beetles, and let all the walls and cieling of your kitchen and apartments where the distrefs lies, be well primed, and thoroughly washed over; give them of the same sort of sugar to feed upon for some days, and you will soon get rid of them.

But

But if this method prove abortive, shut up your kitchen very close (or any other apartment where they trouble you) and funk them well with brimstone: this method has been found of excellent use in garrets infected with buggs, but the wainscoting must also be ripped up, and served as before directed.

*Quicquid agunt homines votum, timor, ira,
voluptas*

Gaudia, discursus, nostri est farrago libelli.

But if this method prove superior, that
 up your kitchen very clean for any other
 apartment where they sit (as you) and
 think them well worth the trouble. The pro-
 cedure has been found of excellent use in
 garters infected with bugs, but the way
 coming must be to be tipped up, and turned
 as before directed.

Quinquid against human column, tiger, the
 Gambia, Gambia, night of far ago hills.

The Great Eastern Fete.

Take of the same water, and add the
 the bottle. And so on the water and oil
 of your kitchen and apartment, where the
 insects are, be well washed, and thoroughly
 washed over, give them all the same for of
 the water, and so on for some days, and you
 will be free of them.

Feb. 16, 1769.

*Nemo vir magnus sine aliquo afflictu Divino
unquam fuit.*

TULL.

IF it be true that no position, either in philosophy or theology, has hitherto been advanced, but has met with opponents, and a lamentable truth it is that often the patrons of opposition to the most excellent and obvious maxims which tend to the good of society, find infinite numbers that espouse their cause: the more ridiculous, the greater numbers often follow them. From hence is seen the absolute necessity of government under proper laws and sanctions, and the inspection and direction of virtuous, steady, and intelligent men; such, and such only, are the glory and dignity of human nature! For though it be true that several excellent personages have been harraſſed all their life-times, and suffered death at last, by designing and self-interested men; yet it is as certain that the in-ward

ward tranquillity and essential happiness, (both living and dying) of the former, is as superior to the latter, as light and chearfulness of mind is preferable to Egyptian darkness and horror.

The present times afford too, too many instances of these truths; and I appeal to every sensible and thinking being, whether in the late and immediate shameful and scandalous divisions about a Catiline, his espousers and partizans have not at all times acted and spoke similar to their patron's words and actions, foaming out sedition, calumny, and falsehoods against the peace of society in general, and many virtuous men in particular, without any the least regard either to sacred or civil characters, and the best of princes that ever lived!

I know it is impossible to convince or reform mankind from errors, after they have so openly avowed and justified themselves and their patron. But it is not to the prejudiced and partial we appeal, 'tis to men of judgment and virtue; who dare oppose and step forth boldly, to stop and stem the tor-

rent of sedition, however tremendous! To these great souls we owe all that is valuable here; and 'tis to them, and them only, their writings, actions, and examples, we have any tolerable prospect of a happiness hereafter.

My motto has laid down these positions as absolute truths; that is, that no good man ever existed, but his excellent actions were directed by heaven. And I have so much charity, even for this patron of sedition himself, and for his sensible adherents (if any be) that neither he nor they will have the assurance or effrontery, to ascribe any of their writings or actions to celestial causes, but surely to the evil spirit, who sows discord and malignity among the licentious and profane sons of men.

Is it possible, that men who believe the existence of an infinitely wise, just, good, and merciful Being! and that they are accountable for their actions, if not always here, yet certainly hereafter, to fly in the face of all laws, civil and religious, as this Quixote and his adherents have done so long;

long ;—even ever since the general peace ; to which, for universal good to mankind, particularly to Great Britain, no treaty ever before can be compared ?

For blessed are, ever were, and ever will be, the peace-makers ; for they are, ever were, and ever will be, the children of God.

W. BENEVOLOUS.



March 16, 1769.

Addressed to Lord Eg——t.

*When wicked men bear rule, the post of honour
is a private station.* Addison's Cato.

I Cannot tell whether any other apology can be made for this celebrated speech, than that the speaker, who is supposed to utter it, was at that period of time in a delirium ; as every one, both before and since, who acts such an unnatural part, ever was and ever will be ; and I do appeal to every
sensible

sensible person, whether reversing my motto is not full of more noble sentiments and ideas, which, if brought forth into action, must tend to the absolute good of mankind, as it always has done in every nation of the world.—If great and illustrious characters have not been the instruments in the hand of Providence, of preserving and delivering every nation from cruelty and oppression, who, or to whom can we ascribe the infinite benefits those nations of ours have enjoyed for these hundred-and-seventy years just elapsed: for undoubtedly had it not been for them, and them only, we had been at this day in the horrid darkness of barbarism, or pontifical slavery; so that I am almost persuaded, “when wicked men
 “bear rule, the post of honour is the *public*
 “station.” Since no real merit can be justly ascribed to any general or statesman, who never had any difficulties to encounter, or turned his back on his country in distress and danger; so in proportion to the arduous circumstances with which either have been involved, and gained the desired end, the
 happy-

happiness of their own people, they have or should have been crowned with immortal honour: for sure neither general, statesman, nor sea-captain of noble courage (who had above all other objects the good of their king and country at heart) gained laurels by turning their backs on their country's foe.

If it be an undoubted maxim here, that a disturbed liberty (now and then) is infinitely to be preferred to a quiescent slavery, how glorious then is public spirit, when conducted with judgment and honourable motives; but when any of these essentials are wanting, all that such empty bladders can accomplish, is nothing but noise and faction.

We have no occasion to go further back than the history of our own times, in search of great statesmen, and illustrious captains both by sea and land—at whom posterity will undoubtedly stand amazed! but more particularly within these eight or nine years just elapsed. Here is the wonderful æra! I defy the annals of England, or of Great Britain, to match them, tho' that silly and imper-

impertinent question has been often asked, Who were the English ministers by last post?

Indeed it must be confessed, they have all meant well in every plan they adopted; that is, if doing and undoing one another's schemes contributed to the service of their country: none of their predecessors could compare with them in the least degree; but the great misfortune is, too frequent conceptions bring forth nothing but wind and vapour!

The wise King of Israel said, *that when wicked men are in power, the people mourn*: and if it was not for this glorious hope, that although they spread their influence abroad, for a while look fresh and gay like the green bay tree on the fruitful plains of *Indostan**, yet they are soon cut down, perish, and wither away, so that their place is no where to be found.

* In August, 1769, such bad news came from India of Hyder Aly having beat the Company's forces, that their stocks were fallen more than a half of what they were before the news came.

To find out great and good ministers here, is a great and arduous task indeed, considering who and with whom they have to do ; and it is as certain, that as infallibility falls not to the share of humanity, there is no individual or body of men, but in many particulars deserve censure ; so that when any are raised aloft on a sudden, they are viewed like a beacon on a mountain's top, and all their foibles, follies, nay, and many, even natural defects, exaggerated beyond reason, or the impartial expectations of discerning minds. For it is certain, if Gabriel was commissioned from on high, he could not please every body ; and it would be miraculous if he gained the majority on his side, though he worked wonders for the good of all.

No mortals sure, except those of just sense and feeling, can possibly imagine the difficulties and perplexities the best of statesmen undergo ; and indeed none but great souls, who can bear them, should ever undertake such Herculean labours. One thing I am persuaded of being a truth, which

which none of understanding will deny, that there are now as great and able men in this present age, as ever any age could boast of; and it would not be a very difficult matter to point them out, since one of the greatest orators that ever lived has told us who they are that should preside over the people. Says he, they should be blameless, *i. e.* men of good report—not lovers of gold—not novices—the husband of one wife, having children.

I shall close this epistle with one observation more, that if any of these characteristics are wanting in a minister of state, he or they, when weighed in the balance, will soon be found wanting in many more.

W. B.

For the PUBLIC LEDGER.

Jan. 30, 1771.

TO GEORGE STEADY, Esq;

SIR,

I Cannot help congratulating my country on the news of Spain's humble condescension in disavowing the act of their governor's seizing Falkland's Island, and after keeping it eight months, being obliged to deliver it back, with whatever belonged to us; and though their renunciation is equivocal enough, yet we hold it as sure as Gibraltar or Port Mahon—For though the latter was wrested from us in the beginning of the last war, the traitor paid as high a price for his cowardice as was possible to be given. As for the former, whoever means or thinks ever to neglect, abandon, relinquish tamely, or privately give up, on any terms or consideration whatever (though exchanged for the Peruvian mountains) deserves to be hung as high as Haman, because

cause it first cost us a very high price, and is of infinite value for our trade and navigation; is as a key to the whole Mediterranean, and like mighty opening doors, under Britannia's direction, takes in, and shuts out friends and enemies, as best answers her interest, honour, and glory. Great politicians often, at particular seasons, insinuate many things they never intend to do or countenance; and if the late celebrated S——y L——d S——d——h said that it was of little consequence to Great Britain, he surely meant only to sooth Spain with his depth of politics, as was practised in the beginning of the reign of George I. But I must beg leave to acquaint him, if he supports that doctrine, or recriminates his old fat ballads, which his confessor Parson Truliber used to rant for his lord and master's entertainment, and at the same time beat his lordship quite out of the field, he may depend upon this as an infallible truth, that he will not hold his present honourable situation much longer than he held being Secretary for the Northern Department. I wish this

last convention with Spain, &c. be not as poorly founded as the principles of the Twitchers! If so, it is impossible to exist long, but fall to the ground, because it has no solid foundation. Every sensible and spirited Briton expected adequate and proper indemnifications for the atrocious insult and immense expence, the consequence of it; but it seems we have, or are to have no more than equivocal words, that nobody can possibly understand, and that if the principals themselves do, that is the question.

However these things may be, we have this consolation, that a little time will clear up these matters, if possible, and also illustrate, whether the Family Compact was not at the bottom of this rash act of the great Spanish Monarch, who, in conjunction with his dear brother, (for I will not join their able ministers in the groupe, being that would rob their masters of the principal honour) believed the British nation were all at variance with one another, because, for these ten years past, so much

scur-

scurrility and nonsense has been published, not to our honour, to be sure : but these sagacious monarchs forgot that true fable, and its essential meaning, of the Bull and his Dogs.

It is certainly a great and glorious work to produce good from evil intentions or actions ; and whether the consequence of this rash act may end in war or peace, it is hard to say ; but this we may say truly, that it has roused the British Lion a little, foiled the republicans, routed and dispersed their scandalous caballing, and united every sensible and true Briton to the interest of their country, and honour of their most excellent sovereign, whose greatest joy must, does, and even will chiefly consist in mildly governing the bravest, most opulent, and most ingenious people on earth.

Si quid novisti rectius istis,

Candidus imperiti si non his utere mecum.

W. B.

London, April 28, 1771.

To the Printer of the PUBLIC LEDGER.

Salus Populi suprema Lex.

HAVING no particular knowledge of any of the contending parties, as a free citizen of the world, and friend to the public good, I think it a duty incumbent on every man to throw in his mite on every important occasion, where public benefit is really concerned; and do seriously appeal to many eminent artizans themselves, how often they have almost suffered shipwreck in navigating their sumptuous barges from the city to Westminster, and in their return, by being run fast and fixed, on the sand banks opposite to Durham-yard, which have increased with the buildings ten fold, almost within these sixty years. The hurt and danger of these growing sand hills is a matter of weight, and calls for the serious attention of the legislature.

I was extremely pleased to hear, that the

Hon. House of Commons had approved of the embankment and the encroachments on the river there, and that the most Honourable House of Lords had that matter before them now for their judgment on the subject, and am fully of opinion, they will almost unanimously agree with the lower house, for the following, and many better reasons than I modestly can, or intend to offer, viz.

That all matter, whether liquid or condensed, holds the same direction, and ever will, which was given it in the beginning: that is, takes the nearest way, and makes the straightest line to their destined place, if not forced out of its natural direction by objects lying in its way, or drove with superior strength by the wind, which nothing could resist, if not restrained by the Author of its being!

The embanking the river, and encroaching on the muddy hollow side from the north corner of Westminster-bridge to the parallel corner of Blackfriars-bridge, making fine buildings, wharfs, &c. &c. after

that amazing and elegant pattern executed on the dunghill of old Durham-yard, would beat every thing of its kind in Europe, and feed thousands of the best workmen in the world, who must travel to other countries for subsistence, if not supported by the brave and generous, who add a more superior dignity to human nature, than all the stock-brokers in the world.

This embanking will contribute to the safety of the navigation, because it will make clear and safe a great part of the river which now is nothing but soil, and it will throw the whole quantity of water which occupied that soily part of the river on the opposite side, and, by degrees, clear the sandy banks quite away to the depth where it can be of no detriment, but quite absorbed. To effect this desired end, let the sandy hills be torn up by machines, whose extremities are nearest the deep water, or the north end be often dug and loosened, and left to the winds and tides; it is probable, by a little art and proper care, that more of these obstructions will be annihilated

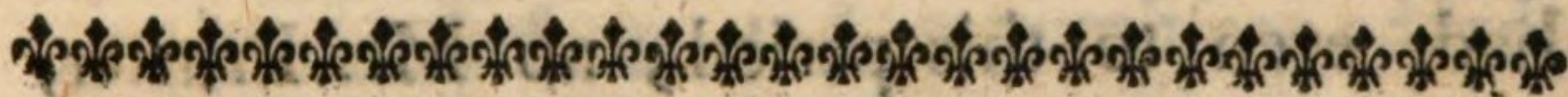
ed in a year, than has been carried off in boats for these twenty last past. The celebrated Addison observes in some part of his writings, that the excellent buildings finished by Louis le Grand during his reign, brought more money into France from travellers than they cost in building; let us imitate the noble examples of even our enemies, but their tyranny and oppression of the subject ever abhor.

If any real gentleman is of a different opinion, shall be exceeding glad of being properly convinced, I am open to conviction, and always joy in salutary argumentation.

Si nos his utere mecum.

HOR.

W. B.



May 6, 1771.

To the Printer of the PUBLIC LEDGER.

WE are told by the papers, that the city had presented a petition imploring his Majesty not to pass the embanking Bill of the river Thames.

I was

I was sorry for this step, because it wears the face of obstinacy, and indicates a want of understanding. Can it be supposed that the King will reject a Bill, passed by both Houses of Parliament, with the maturest deliberation that could be wished? *Salus Populi suprema Lex*, is, and indeed ought to be, the absolute rule and guide of every wise administration; if it had not been so upon former occasions, this famous city itself, at this day, would be little better than a filthy channel, such as Durham-yard was, but two years and a half ago!

Was it not for this supreme law, neither fleets nor armies, magazines, public or private good buildings, bridges, roads, turnpikes, or manufactories, should we have had, even to this period; no Mr. Printer, we should have been like the uncultivated Hottentots, whose manners are much the same now, as England's about seventeen hundred years since.

Is it possible for any impartial and sensible man to believe, that the embanking of the river Thames will not improve the navigation

vigation of it ; when it is certain, some hundred years ago, the Strand in London was a branch of it, and now more than twenty thousand houses are built on that antient embankment ? The river, before these necessary encroachments, was hardly navigable for any thing ; and by this fresh embankment, will undoubtedly be greatly improved ; for the navigation, by being circumscribed in a narrower compass, will consequently be deeper and safer. Besides, the filling up of the great hollow belly of the north side from one end of Westminster-bridge to the parallel end of Blackfriars, will throw such a weight of water on those intolerable sand-banks opposite, that by the assistance of art, properly used, in tearing up their surfaces and extremities, added to the natural strength of the current, and the flux and reflux of the tide, as must carry off those shameful nuisances ; and give inexpressible joy to every discerning and impartial mind.

Jam nova progenies Cælo !

W. B.

June 10, 1771.

To the Printer of the PUBLIC LEDGER.

IN some of the papers the other day, there appeared a letter addressed to my Lord Chatham, which told us that all the “ victories we gained in the last glorious “ war, were thrown away by a temporary, “ inglorious, and destructive peace.”

It is said (perhaps with truth) that the peace might have been better; but this is only a position, and carries no argument along with it. The true question is, whether the last peace was not more honourable and advantageous, than carrying on the war any longer could have been?

There is a saying, which is allowed to be an excellent one, that the conclusion of all works crowns or kills the whole; and had we missed reducing the Havannah, it is a thousand to one but all our former victories had been useless, and that a peace must have been made, though ever so indifferent,

ferent. Eighteen millions besides must have been provided for the succeeding campaign, and seventeen thousand men were wanted in Germany, where nothing could be expected further.

If any treaty in history, antient or modern, could with propriety be denominated adequate, great, and glorious, this sure under consideration, deserves these noble epithets: because it took in and comprehended more of this globe, than any other which can be named, a great part of Europe, Asia, Africa, and America.

If it be a truth of undoubted certainty, that the absolute ruin of the greatest conquerors has resulted from their not stopping where they could well govern, and utterly neglecting that golden rule of treating others as they would wish themselves to be treated, it must appear to every humane and sensible mind, that the last general peace was of infinitely more value than if we had conquered and kept all the gold and silver mines both of Mexico and Peru; because too much gold, without honest industry

dustry, has been the destruction of their possessors, and ever will prove so. Besides, there is a necessity of preserving a proper contrast in trade; for it is a certain fact, that when Guadalupe and Martinico were in our own hands, and the seas at that period much clearer of privateers than before, we paid ten-pence per pound for sugars, though before we gave only seven-pence. Such is the honesty of mankind; and to illustrate this mode of reasoning, let me ask, if there were but one baker in a parish, would the inhabitants be so well served in any respect, as when a dozen solicit for their custom?

W. B.

THE END.

A P P E N D I X

T O T H E

SECOND EDITION

O F

Nature, Philosophy, and Art, in
Friendship.

TH E Author of that Treatise takes this opportunity of returning his sincere thanks to the Public, for the kind reception it met with in the first impression, and humbly hopes, that an explanation of the new-invented Iron-plate Scheme, annexed to the second edition, will render that work still more compleat, and truly useful to all, but more particularly to every Nobleman, Gentleman, and ingenious Mechanic, who have houses to build, preserve, or improve.

The Inventor of this new Scheme is a Gentleman of parts and property, and has met with great encouragement, besides the approbation of many good judges, and some of the most illustrious personages

I

of

of the age, before whom the experiment has been tried, and so much approved, that Parliament granted two thousand five hundred pounds for promoting and bringing the scheme to perfection.

The method of executing the Iron-plate Scheme is as follows :

Your house being covered in, and all the joists and girders of the naked floors laid, there must be two rough thin counter floors, such as are commonly made use of to prevent sound communicating from one apartment to another, one below, and the other upon the girders and joists, and flush with them, on which floors the iron plates must be all laid as close as possible to each other, and lapping over one another an inch at least, and fixed down with short flat-headed nails. And to prevent as much as possible the air from penetrating through from one story to another, or affecting the main joists or girders, let the iron plates be inserted four inches in the walls, all round the room, wherever they are used, and pinned or stopped close in with bricks and mortar, so as the air or fire can no
more

more penetrate there than in any other part of the room. For in this lays the great secret of hindering the air or fire from communicating from one story to another; for wherever one goes the other will go likewise. The furniture of one room may be destroyed, and the upper floor of that apartment; but if an iron door be put in the inside of the room, instead of a wooden one, the misfortune will, in all human probability, be confined to that single apartment where the fire began; and if glass could be made so as to stand the force of fire, iron safes would be of excellent use; and as some glass has been found to remain whole after surprizing heat, iron safes deserve particular attention, and ought to be preferred in all buildings of consequence, and wooden stairs every where excluded.

The iron plates which cover the counter floors, which we have mentioned before, may be milled to the thickness of cartridge paper; for if thicker, they would retain too much fire in them, and might convey it to the floors, joists, and girders,
on

on which they are fixed, and by that means destroy the end for which they are intended. Their size need not be above eighteen inches by twelve, for if larger they would be more expensive, and not fit so close, or be so convenient for the purpose.

The laying the boarded floors being some of the last operations of every house, they may be laid down with dowells nails, or dove-tails, but the boards must be made all of one thickness, by reason of their junction with the iron plates, on which the flatter they lay the better.

Respecting the ceilings, it will be said, that plaister will not cohere, or stick fast to the iron plates; granted: To obviate that objection, after all the plates are nailed down on the counter floors, and inserted in the walls, as before described, let the best oak laths be used within three or four inches of one another, and all counter-lathed at the same distances, the plaister will naturally form a key behind, and bear up, flatten, and finish as well as any ceiling whatever.

As

As the quantities of timber used in all houses, particularly in the naked floors, are the principal causes of all the misfortunes that happen by fire to buildings in general, let all the vacuums, or empty spaces, between the joists and girders be filled with dry earth or brick rubbish, in place of sand or sea-shells, which are commonly used for deafning or preventing noise from communicating from one apartment to another. They will answer that purpose infinitely better, by reason of their nature and density, and are almost incapable of being liquidated by fire, as sand and sea shells certainly are.

W. BENEVOLUS.

*Felix qui potuit rerum cognoscere causas.
Ruit arduus Æther.* VIRG.

ARCHITECTURE.

The following New Books of Architecture have been lately published, printed for ISAAC TAYLOR, at the Bible and Crown, in Holborn, near Chancery-lane; and sold by the Booksellers in Town and Country.

I. **THE PRACTICAL BUILDER, or WORKMAN'S GENERAL ASSISTANT:** Shewing the most approved and easy Methods for drawing and working the Whole or separate Part of any Building; as the Use of the Trammel for Groins, Angle-Brackets, Niches, &c. Semi-circular Arches on flewing Jambs; the preparing and making their Soffits, Rules of Carpentry, to find the Length and Backing of Hips, strait or curved, Trusses for Roofs, Domes, &c. Trussing of Girders, Sections of Floors, &c. The Proportion of the Five Orders in their general and particular Parts, Gluing of Columns, Stair-cases with their ramp and twist Rails, fixing the Carriages, Newils, &c. Frontispieces, Chimney-pieces, Cielings, Cornices, Architraves, &c. in the newest Taste, with Plans and Elevations of Gentlemen's and Farm-houses, Yards, Barns, &c. By WILLIAM PAIN, Architect and Joiner. Engraved on Eighty-three Plates, bound 12s.

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E R R A T U M.

THE ingenious and candid Reader will see, in page 18. the *acute* triangle, which describes the flanks of the arches, by mistake called *equilateral*, &c.

As *arsenick* has a frightful meaning, it may be excluded in all the operations, and the spirits of salt or turpentine used in its stead.

Joists of wood may, with propriety, be used over all the arches, and floors of wood instead of plaister or tarras, according to every gentleman's fancy or inclination.

F. R. A. T. U. M.

THE ingenious and candid Reader will
see, in page 18. the same triangle,
which describes the flanks of the arches, by
mistake called *the flanks*, &c.

As a series has a rightful meaning, it
may be excluded in all the operations, and
the points of the corresponding arch in its
place.

Joists of wood must, with propriety, be
laid over all the arches, and floors of
wood instead of plaster or stone, according
to every gentleman's way of inclination.



Cauty, William

Nature, Philosophy and Art in friendship An essay in four parts

London 1775

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